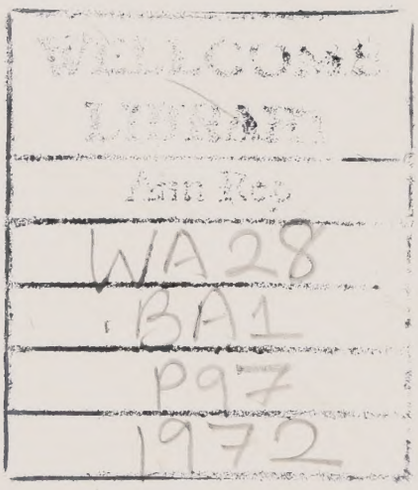
Public Health Laboratory Service

1972 YEAR BOOK

including Annual Report for 1971



CONTENTS

THE PUBLIC HEALTH LABORATORY SERVICE BOARD

Dr. J. B. Meredith Davies, a member since 1967, resigned from the Board on his appointment as Director of Social Services for the City of Liverpool. He is succeeded by Dr. W. G. Harding, Medical Officer of Health for the London Borough of Camden, and Consultant in Community Medicine, University College Hospital, London.

THE PUBLIC HEALTH LABORATORY SERVICE BOARD

Chairman: E. T. C. Spooner, C.M.G., M.D., F.R.C.P.
(late Dean, London School of Hygiene and Tropical Medicine, London)

Members: F. A. Adams, C.B.
(late Under-Secretary for Finance and Accountant General, Ministry of Health)

R. C. Bryant, C.B.
(late Under-Secretary, Board of Trade)

Professor A. C. Cunliffe, M.A., M.D., F.R.C.Path.
(Professor of Bacteriology, University of London, at King's College Hospital Medical School, London)

G. D. Duncan, M.B., D.P.H.
(Senior Administrative Medical Officer, East Anglian Regional Hospital Board)

A. J. Essex-Cater, M.R.C.S., D.C.H., D.P.H., D.I.H., F.R.A.I.
(Medical Officer of Health, Monmouthshire County Council)

W. G. Harding, F.R.C.P., F.F.C.M., D.P.H.
(Medical Officer of Health, London Borough of Camden)

Professor K. McCarthy, M.D., F.R.C.Path.
(Professor of Medical Microbiology, University of Liverpool)

R. M. Shaw, C.B., M.B., D.P.H.
(Deputy Chief Medical Officer, Department of Health and Social Security)

Professor R. A. Shooter, M.A., M.D., F.R.C.P., F.R.C.Path.
(Professor of Bacteriology, University of London, at St. Bartholomew's Hospital Medical College, London)

C. E. Gordon Smith, C.B., M.D., F.R.C.P., F.R.C.Path.
(Dean, London School of Hygiene and Tropical Medicine, London)

C. C. Stevens, O.B.E., LL.B.
(Member of Manchester Regional Hospital Board; Chairman, Macclesfield and District Hospital Management Committee)

J. F. Warin, O.B.E., M.A., M.D., M.R.C.P., D.P.H.
(Medical Officer of Health, Oxford)

G. I. Watson, O.B.E., M.D., F.R.C.G.P., D.T.M. & H.
(Medical Practitioner, Peaslake, Surrey)

Professor P. Wildy, M.B., M.R.C.S., F.R.S.E.
(Professor of Virology and Bacteriology, University of Birmingham)

Staff Assessors to the Board:

B. Moore, M.D., B.Sc., F.R.C.Path.
M. T. Parker, M.D., F.R.C.Path., Dip.Bact.

Secretary:

J. D. Whittaker, M.B.E.

HEADQUARTERS ADMINISTRATIVE OFFICE

24 Park Crescent, London, W1N 4DA
Tel.: 01-636 2223

Sir James Howie, LL.D., M.D., F.R.C.P., F.R.C.Path. (*Director of the Service*)

J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact. (*Deputy Director of the Service: see also* pages 27 and 38)

J. D. Whittaker, M.B.E. (*Secretary of the Board*)

R. H. Westlake (*Finance Officer and Deputy Secretary of the Board*)

J. W. Bushell (*Establishments Officer*)

R. V. Jackson (*Accountant and Supplies Officer*)

*A. Waltho (*Officer in Charge*), MRC Central Store, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 0071

* Member of the staff of the Medical Research Council.

INTRODUCTION

ADMINISTRATION AND ORGANISATION OF THE SERVICE

The Public Health Laboratory Service is the successor of the Emergency Public Health Laboratory Service planned, organised and administered during the war years 1939–1945 by the Medical Research Council, at the request of H.M. Government. In 1945 it was decided by the Government to retain the Service on a permanent footing. Statutory authority was provided by Section 17 of the National Health Service Act, 1946, which empowered the Minister of Health to provide a " bacteriological service " for the control of the spread of infectious diseases. Later the Medical Research Council agreed to an extension of the period of their administration, with the delegation of detailed responsibility to the Public Health Laboratory Service Board appointed by them for this purpose. In 1960, however, the Public Health Laboratory Service Act, 1960, established and incorporated a new Public Health Laboratory Service Board as a statutory body capable of acting in its own right as agent for the Minister. The Act also provided for the transfer of staff of the Service from the employment of the Council to that of the Board, and the transfer of property from the Council to the Minister of Health; these transfers took effect on 1st August, 1961.

The Chairman and members of the Public Health Laboratory Service Board are appointed by the Secretary of State for Social Services and, in accordance with the Schedule to the Act, the members must include the following (and must therefore be at least eight in number, in addition to the Chairman):

(*a*) not less than two persons appointed after consultation with the Medical Research Council;

(*b*) not less than two persons with experience as microbiologists, appointed after consultation with such organisations as the Secretary of State thinks appropriate;

(*c*) not less than two persons holding office as medical officer of health to a local authority;

(*d*) not less than one person appointed after consultation with such organisations as appear to the Secretary of State to represent the hospital service;

(*e*) not less than one fully registered medical practitioner engaged in general medical practice, appointed after consultation with such organisations as the Secretary of State may recognise as representative of practitioners so engaged.

The Chairman and members of the Board are normally appointed for a term of three years.

The Board exercises its functions in accordance with any directions received from the Secretary of State for Social Services. In the exercise of these functions it acts as a principal.

The staff of the laboratories of the Service are appointed and employed by the Board. The directors of the constituent laboratories are whole-time medically qualified microbiologists, with full consultant status. Professional staff are selected to a large extent from newly qualified medical graduates after they have held house appointments for 12 months or longer, they then receive five years' training in pathology and microbiology. During the third year the trainee is required to obtain the Diploma in Bacteriology of the University of London or of the University of Manchester. The Service also receives fully trained recruits from the Hospital Service and from the universities. As a general rule, science graduates without medical qualifications are employed only in the reference laboratories (*see* page 38) where the work is of a highly specialised nature.

The technical staff of registered medical laboratory technicians are recruited from boys and girls leaving school at 16 to 17 years of age, who have attained the necessary standard of education; they go through a system of training in academic and practical subjects now becoming general in pathological laboratories throughout the country.

The development of the Service between 1946—in which year it was established in its present form—and 1971 may be summarised as follows:

	1948	1955	1962	1971
Number of Constituent Laboratories	36	56	59	62
Medical staff	84	124	132	140
Scientific staff		26	39	85
Technical, Clerical and Maintenance staff ..	562	778	956	1,277
Total specimens examined ..	793,314	1,689,033	2,314,126	3,984,000

SCOPE OF THE SERVICE

The Public Health Laboratory Service is designed to make the laboratory investigations needed to provide a continuous picture of the communicable microbial diseases of England and Wales. These diseases must be accurately defined by identifying the agents that cause them, by continuously seeking out and recording their whereabouts, and by investigating what really matters in promoting or limiting their spread. The activities of the P.H.L.S. allow useful advice to be offered to the central and local health authorities, and to others concerned with the control and prevention of these diseases.

The Service at present consists of 10 Regional Laboratories (*see* page 28), 52 Area Laboratories (*see* page 30), and 16 Reference and Special Laboratories (*see* page 38), most of the latter being grouped as the Central Public Health Laboratory at Colindale, London, NW9 5HT. Almost all the Regional and Area Laboratories are situated in hospitals, and in addition to their special functions within the Public Health Laboratory Service, act as the microbiological component of a group laboratory undertaking clinical work for the hospital staff, local general practitioners and medical officers of health. Specific public health work is also undertaken for medical officers of health over a wider

area. In certain places where there is not a Public Health Laboratory, arrangements are made for this work to be done by a hospital microbiologist acting for the Public Health Laboratory Service. Personal consultation between clinicians and the medical staff of local health authorities are welcomed. Members of the laboratory staff are prepared to investigate outbreaks of communicable disease in the field if asked to do so.

In certain circumstances Public Health Laboratories receive specimens from general practitioners outside the normal clinical area of the group laboratory; for example, specimens of public health interest requested by the medical officer of health, or specimens needed as part of one of the nationwide surveys which form a major activity of the Service. The Reference and Special Laboratories normally receive specimens only from other laboratories.

All specimens must be submitted by doctors, veterinarians, dentists, public health inspectors, and others acting on behalf of medical officers of health, Government Departments, or representatives of other official bodies; specimens cannot be accepted from private persons (see, however, sub-paragraph (*b*) below).

The routine specimens fall under two main heads:

(*a*) " Clinical " specimens received from hospitals, general practitioners and local health authorities. These are specimens of sputum, faeces, throat swabs, blood samples, etc., taken from persons suspected of suffering from (or being capable of transmitting) a microbial disease.

(*b*) " Sanitary " specimens: these are received from medical officers of health, public health inspectors, and others concerned officially with the control of the public health. They comprise specimens for bacteriological examination of water, shell-fish, watercress, sewage, milk and cream; of processed foods such as ice-cream, artificial cream and canned foods; and of imported products such as the various forms of meat, fish, processed egg, coconut and fertiliser. The Service normally examines only material offered to the consumer, but will, of course, examine specimens taken at any stage of production or distribution by medical officers of health investigating suspected food-borne infections. The Service is ready to give free advice to food manufacturers and processors to assist them in the production and distribution of bacteriologically safe products. For routine control of such products, commercial firms are charged a fee, but work of this sort is undertaken only exceptionally.

The epidemiological work of the Service includes not only the investigation of outbreaks of infectious disease, in co-operation with local medical officers of health, but also studies of the distribution and behaviour of infectious agents throughout England and Wales, and of the various aspects of the immunisation programme. Epidemiological information is collected centrally week by week from public health and hospital laboratories all over the country, including Scotland, Northern Ireland and Eire and then made available to each of these laboratories in turn in the form of a confidential weekly " Communicable Diseases Report ".

Field investigations of infectious disease, and field trials of protective agents, including vaccines, are frequently carried out. All laboratories are engaged to some extent in research in addition to routine work.

A special feature of the Service is the investigation of various problems by Working Parties containing a dozen or more members drawn from laboratories in different parts of the country. Some of the problems investigated are of direct concern to Government Departments, with which close working relations have always existed.

Brief mention has already been made of the reference laboratories and specialist departments. These provide facilities for the exact identification and " finger-printing " of organisms belonging to many different groups. This is sometimes required by clinicians in their treatment of patients, but more often for epidemiological purposes. The reference laboratories are freely available for consultation by any laboratory within or without the Service. Some of these typing facilities are available at regional and area laboratories; before sending specimens to a reference laboratory the local Public Health Laboratory Service Director should be consulted. In addition, a number of reference experts are retained for the examination of occasional specimens which require special skill, special knowledge, or special reagents.

The Service distributes various vaccines and sera on behalf of the Department of Health and Social Security. It also provides certain reagents for diagnostic purposes, prepared by or issued from the Standards Laboratory for Serological Reagents at the Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT (*see* page 40).

Directors of Public Health Laboratories are always prepared to discuss the facilities they can offer, either directly or through other units of the Service, and how these facilities may best be used.

GRANTS AND OTHER ASSISTANCE RECEIVED OR RENEWED FOR SPECIAL INVESTIGATIONS IN 1971

The Public Health Laboratory Service Board now receive valuable assistance from the Departmental Research and Development Fund of the Department of Health and Social Security. Allocations from this fund have enabled the Board to undertake the following important projects, involving research work of an " operational " nature:

A study of the use of a computer for the identification of bacteria.

Laboratory investigations into farmers' lung.

An investigation of laminar flow ventilation and the determination of its effectiveness in protecting hospital patients who are at special risk to cross-infection.

An investigation into hepatitis in a special community.

The establishment of reference facilities for monitoring transferable drug resistance.

The surveillance of whooping cough and B.C.G. vaccines.

The Board also receive grants from the following bodies for the assistance of special investigations and the acquisition of major equipment of a special nature:

(*a*) From the World Health Organisation:

$5,000 for the assistance of laboratory research on enteric phage-typing at the International Centre recognised at the Enteric Reference Laboratory, Colindale, London.

$5,000 for the International Shigella Centre recognised at the Dysentery Reference Laboratory, Colindale, London.

$3,000 for the International Reference Centre for Staphylococcal Phage-typing recognised at the Cross-Infection Reference Laboratory, Colindale, London.

$2,500 towards the cost of testing the specificity of virus antisera at, and the supply of viral antigens and positive control sera by the Standards Laboratory for Serological Reagents, Colindale, London.

$2,500 for the preparation and testing of reagents (rhinovirus), at the Virus Reference Laboratory, Colindale, London.

$4,000 towards the cost of epidemiological serological investigations of tropical sera for antibodies in treponematoses at the Venereal Diseases Reference Laboratory, London Hospital Research Laboratories, London.

$1,500 for research on the bacteriology of leptospirosis at the Leptospirosis Reference Laboratory, London School of Hygiene and Tropical Medicine.

(*b*) From the British Diabetic Association:

Dr. D. R. Gamble (Director, Public Health Laboratory, Epsom).

Provision for an investigation into certain aspects of viral pancreatitis, and the part played by viral infection in the development of diabetes, with particular reference to coxsackie virus infection.

In addition to the provision of research grants described above, two research projects are in progress jointly with the Medical Research Council, in which members of the Council's scientific staff are collaborating. These are as follows:

Research work on viruses at the Epidemiological Research Unit, Cirencester, Gloucestershire;

Various studies at the Cross-Infection Reference Laboratory, Colindale Avenue, London, NW9 5HT.

Laboratory Directors in the Service are also carrying out investigations in conjunction with general practitioners and hospital medical officers in many places, notably in the study of chronic bronchitis, of hospital cross-infection, and of sterilisation and disinfection problems; on gastro-enteritis and the safety of various foods.

A clause of the Schedule of the Public Health Laboratory Service Act, 1960 permits the Board to accept, hold and administer private gifts on trust for any purpose related to the Public Health Laboratory Service or otherwise connected with bacteriological research. Donations received during 1971 were as follows:

£200 from the Winthrop Laboratories (formerly the Bayer Products Company) towards the expenses of an investigation on urinary pathogens being undertaken by Dr. P. J. Wormald of the Salisbury Laboratory.

£350 in each of seven years from 1971 to 1977 inclusive, from Ethicon Limited for research in the Cardiff joint Laboratories.

£150 from Pfizer Limited towards the cost of research into brucellosis being undertaken by Dr. D. J. H. Payne of the Portsmouth Laboratory.

REVIEW BY THE DIRECTOR OF THE SERVICE OF ACTIVITIES IN 1971

LABORATORIES

The Regional Public Health Laboratory, Cardiff and the Tuberculosis Reference Laboratory moved to new accommodation at the newly built University Hospital of Wales at Heath, Cardiff during the summer of 1971. The Hospital was formally opened by Her Majesty the Queen on 19th November, 1971.

The Area Public Health Laboratory, Watford moved to the new Shrodell's Hospital, Watford on 4th June, 1971.

The Area Public Health Laboratory, Shrewsbury moved to new accommodation at the Royal Salop Infirmary Group Laboratories, Shrewsbury on 12th June, 1971.

The Area Public Health Laboratory, Northallerton closed on 31st December, 1971.

After the death of Dr. K. Patricia Carpenter, Director of the Dysentery Reference Laboratory, Colindale since 1956, the work of the Laboratory has been re-allocated. Much of the work will continue to be carried out at the Central Public Health Laboratory, Colindale under Dr. B. Rowe, the title of whose Laboratory is now " Salmonella and Shigella Reference Laboratory ". Dr. Joan R. Davies, Director of the Area Public Health Laboratory, Guildford will act as Reference Expert for the confirmation and typing of *Shigella sonnei*. Dr. A. L. Furniss, Director of the Area Public Health Laboratory, Maidstone will be responsible for the work on cholera, with Dr. P. Cavanagh, Director of the Area Public Health Laboratory, Stafford as an additional Reference Expert. Dr. S. P. Lapage, Curator of the National Collection of Type Cultures, and Dr. C. M. Patricia Bradstreet, Director of the Standards Laboratory for Serological Reagents, Colindale, will take over certain other work previously undertaken by the Dysentery Reference Laboratory.

DEATHS

In addition to the deaths of Dr. K. Patricia Carpenter, and Dr. I. G. Murray, Director of the Mycological Reference Laboratory since 1961, both of which were reported in the 1971 Year Book, it is with regret that we have to report the deaths of Dr. Helen G. T. Grant (née Maycock), a Senior Microbiologist at the Area Public Health Laboratory, Whipps Cross Hospital, London; of Dr. P. Thillainathan, an Assistant Microbiologist at the Area Public Health Laboratory Portsmouth; and of Dr. W. Odrzywolski, a Senior Microbiologist at the Regional Public Health Laboratory, Leeds from 1961 to 1969.

RETIREMENTS

During 1971 four senior members of the staff retired after long and valued service: Dr. G. J. G. King, Director of the Area Public Health Laboratory, Poole (formerly at Bournemouth), a member of the EPHLS/PHLS since 1939; Dr. J. M. Croll, Director of the Area Public Health Laboratory, Lincoln, a member of the EPHLS/PHLS since 1939; Dr. W. H. H. Jebb, Director of the Regional Public Health Laboratory, Oxford, a member of the P.H.L.S. since 1949; and Dr. G. T. Cook, Director of the Area Public Health Laboratory, Guildford, a member of the P.H.L.S. since 1946.

TRANSFERS

In September 1971 Dr. J. G. Wallace, Director of the Area Public Health Laboratory, Northallerton, was transferred to succeed Dr. J. M. Croll as Director of the Area Public Health Laboratory, Lincoln.

In November 1971 Dr. P. G. Higgins, Consultant Virologist at the Epidemiological Laboratory, Cirencester and at the Area Public Health Laboratory, Gloucester, was transferred to the Virus Reference Laboratory, Colindale.

In December 1971 Dr. Joan R. Davies, Director of the Area Public Health Laboratory, County Hall, London, was transferred to succeed Dr. G. T. Cook as Director of the Area Public Health Laboratory, Guildford.

LOCUMS

We are most grateful to the following people for help with locum duties: Dr. J. A. Boycott at Taunton; Dr. R. Norton at Stafford, Sunderland, and Teesside; Dr. D. A. Skan at Southampton; and Dr. Joan Taylor at Salisbury.

VISITING WORKERS

Many people spent periods at the laboratories at Colindale, Carmarthen, Guildford, Leicester, Liverpool, Manchester, Portsmouth, Sheffield, Sunderland, Swansea, Worcester, the Tuberculosis Reference Laboratory, and the Venereal Diseases Reference Laboratory.

ROUTINE WORK OF THE SERVICE

In 1971 the 63 Regional and Area Laboratories of the Service examined 3,984,000 specimens (an increase of 7 per cent on last year's figures), of which 285,000 were virological (an increase of 32 per cent on last year's figures). As before, the work came from hospitals, local health authorities, general medical practitioners, and veterinarians. The routine work continued to provide the basis for numerous epidemiological investigations and for a number of surveys. The extent and nature of these activities may be judged from the committees and working parties (pages 59–63, Appendix I) and to lists of published papers (pages 65–75, Appendix II).

" Communicable disease is still the major concern of more than half the world's population and a great deal of it stems, like cholera, from a lack of understanding and poor environmental and hygienic standards." So wrote *The Lancet* (May 29th, 1971, page 1114) reviewing the 1970 report by the Director-General on the work of the World Health Organization. Our own Service collaborates extensively with WHO and many of the lessons learned from our own experiences are of value not only to ourselves but to countries abroad.

In the section on scientific work, which follows, eight short articles summarise certain matters of general interest which seem suitable for presentation in this form.

SCIENTIFIC WORK

The Work of a Virus Laboratory in a Large City

In collaboration with the Regional Hospital Board, which willingly accepted a fair share of capital and running costs, a virology service for the Leeds Region has now been set up by the Leeds Public Health Laboratory. The service accepts virology specimens from an area populated by more than 2,000,000 people, including over 40 hospitals and the local authorities and general practitioners services in the area. Specimens are also received from special surveys. In particular there has been, and will continue to be, ever-increasing work on the clinical and epidemiological aspects of rubella, both as surveys and individual work for doctors.

Service provided by the laboratory: The work of the laboratory is not limited to diagnostic tests but includes epidemiological investigations; in fact, any worthwhile virological work is considered. The service consists of serological tests and attempts to demonstrate the presence of a virus. The recently acquired electron microscope is a most valuable aid, and its use for diagnostic purposes is increasing.

In this area we have received remarkable co-operation in securing paired samples of serum. These are essential in order to confirm a diagnosis by showing a fourfold or greater rise in antibody titre. The complement-fixing antigens in frequent use include influenza A and B, mumps S. and V, respiratory syncytial virus, measles virus, adenovirus, herpes simplex virus, varicella-zoster virus, cytomegalovirus, psittacosis/LGV group, *Rickettsia burneti*, and *Mycoplasma pneumoniae*. Haemagglutination inhibition tests are performed for antibodies to rubella, measles, and members of the myxovirus and poxvirus groups. Tests for neutralizing antibodies—for example, to Coxsackievirus group B, are available but are used only in selected cases. Paul Bunnell tests for infectious mononucleosis are performed. Recently, gel diffusion, immunoelectro-osmophoresis, and electron microscopy have been brought into use in testing for Au/SH antigen. At present one of the functions of the laboratory is to examine selected donor bloods from the Blood Transfusion Service for this antigen. This laboratory acts as a special centre for the examination of specimens for smallpox, cytomegalovirus, rubella, and Au/SH antigen. The department also advises on the use of various types of human immunoglobulin, and issues the appropriate product as necessary.

Attempts to isolate viruses are made by the inoculation of specimens into various tissue cultures, fertile hens' eggs, or animals. Because the cultural conditions required by different viruses vary considerably, the best use can be made of the facilities available only if an adequate history of the patient's illness is provided.

Positive results: A laboratory is often judged on its proportion of positive results, but it should be remembered that negative findings may be of equal importance. It must be stressed that merely to test numerous specimens is a waste of time and money unless the work yields results which have clinical or epidemiological importance.

In 1964 the laboratory received 2,388 specimens (1,809 serum samples and 579 specimens for virus isolation). By 1970, this figure had increased annually until in that year we received 9,583 specimens (5,784 serum samples and 3,799 specimens for virus isolation). During this seven-year period the average positive virus-isolation rate remained just over 10 per cent. The proportion of serum samples involved in a positive diagnosis was somewhat higher; 16.6 per cent of the sera received during 1970 yielded results which were required for making or confirming a positive diagnosis. It should be emphasised that most of these results were from routine diagnostic tests; during epidemics and in selected samples higher positive rates are the rule.

During 1964–1970 specimens received from hospitals and general practitioners increased considerably, but those from local authorities remained constant. From 1st January to 30th September 1971 over 10,000 specimens were received.

Other work in the Regional Laboratory: This includes teaching commitments in diagnostic virology for students attending courses leading to the D.P.H., the M.R.C.Path, and the B.Sc. degree. We also instruct visitors who are attached to the laboratory for varying periods. In addition, the student laboratory technicians' H.N.C. course in virology is organised and held in the department.

Problems: It is difficult to maintain high standards in such a rapidly expanding diagnostic virological service. However, a much greater problem is to attempt to provide an " out of normal hours " service. Due to shortage of virologists and skilled workers able to operate such instruments as an electron microscope, it can be exceptionally difficult to maintain a comprehensive diagnostic service during a full 24-hour period. A correct selection of specimens for special or routine service depends upon good communication and personal contact with the person requesting the examination.

In this area the requests for virological examinations continue to increase, and it is astonishing how much trouble hospital doctors and general practitioners will go to in order to transport specimens to the laboratory. This indicates an active interest in trying to establish a diagnosis. Provided that suitable specimens are sent and adequate information supplied, and that the results are meaningful, virology should continue to expand within reasonable limits of expenditure.

Advantages of Centralised Serotyping of Salmonellas. The routine laboratory uses a restricted range of salmonella antisera and with this range is able positively to identify a small number of salmonella serotypes. If the epidemiology of salmonella infections is to be unravelled, a reference service providing full salmonella serotyping is a necessity. Originally, this was provided entirely by the Salmonella Reference Laboratory, Colindale, but in the early 1950's the service was decentralised and three regional salmonella centres were established. These regional centres were at Poole, Northallerton, and Birmingham; and each accepted responsibility for laboratories in the surrounding areas.

The Salmonella Reference Laboratory, Colindale, continued to act as a regional centre for S.E. England and as the parent laboratory for the other three regional centres. In addition, the Salmonella Reference Laboratory had a wider role as the National Salmonella Centre for Great Britain together with a special responsibility for the Commonwealth. This international work involved close co-operation with the other national salmonella centres and the W.H.O. designated International Salmonella Centre at Paris.

Because of rearrangements within the P.H.L.S., it became impossible to retain the salmonella serotyping service at Poole and Northallerton after 1971. During 1970 the Salmonella Reference Laboratory, Colindale, serotyped 5240 strains and the three regional centres serotyped 4345 strains. The centres at Poole and Northallerton accounted for almost 95 per cent of all the serotyping done in the regional centres. The situation provided an opportunity to reappraise the arrangements for salmonella reference work. It was necessary to establish two new regional centres or to centralise all reference work at the Salmonella Reference Laboratory, Colindale. It was decided that in the future all salmonella reference work would be centralised at Colindale.

A centralised system will in no way interfere with the ability of routine laboratories to study salmonella epidemiology in their areas or regions. Laboratories will continue to identify salmonellas to a level of identification limited only by the range of sera available. The Salmonella Reference Laboratory will encourage active liaison and a two-way flow of information should be readily established. In this respect the Salmonella Reference Laboratory will function in a precisely similar manner to the former regional salmonella centres, but would be able to superimpose national information in the interpretation of local epidemiology.

The ability to provide such a national picture will be one of the major advantages of centralising all salmonella reference work. There is an obvious demand for this information and a centralised scheme will be able to correlate it much more quickly than a scheme using regional centres. Information of this type will always precede that of the Communicable Disease Report organisation; and in many instances it will be a real early-warning in the recognition of changes in patterns of salmonella epidemiology.

During the last five years the demand for salmonella serotyping has doubled and this rate of increase is likely to continue. A large centralised organisation should be able to absorb such increases of work-load in a more economical manner than several small regional centres. In addition, the operation of the large laboratory will allow maximum use of mechanisation and automation, especially in serological techniques.

With these future arrangements the Salmonella Reference Laboratory will serotype over 10,000 salmonellas each year. All strains will be studied by the same standardised techniques and an enormous store of data on biochemical, serological, and other characteristics will accumulate. Analysis of this data will be invaluable in taxonomical studies; and changes in other parameters will also be assessed periodically.

Accumulation of data on this scale is ideally suited to automatic processing with the use of a computer, and this will reveal the full potential of centralised salmonella reference facilities. Computer handling will allow relevant information to be readily available not only to the central laboratory but also to the outside laboratories collaborating in the work.

Use of New Techniques in the Standards Laboratory

New techniques are continually being introduced into the work of the Standards Laboratory both for diagnostic and research purposes. They may either enable us to increase our knowledge of the reagents or provide means of producing more specific reagents. Examples of such techniques in recent years are given here.

The complement-fixation test (*CFT*). When the CFT is performed on a serum as a straight line titration with an antigen at its optimal dilution, the reaction involves a single antigen. The spectrum of antigens present in complex organisms or microbial suspensions and antibodies to them in human and animal sera can be studied in CFTs performed in chessboard titrations in which an antigen at different dilutions is seen to react optimally with different sera or with one serum at different dilutions. By these means it is possible to detect the multiple antigens present in—for example, hydatid cyst fluid;[1] and to differentiate between virus and tissue culture antigens in a viral preparation.

Although the CFT was first described for use in the diagnosis of bacterial infection it fell into abeyance for this purpose at a time when the current technique was cumbersome and methods for the isolation of organisms were becoming simpler. However, with the advent of antibiotics the isolation of organisms has often become more difficult while the CFT has been simplified and standardised and is widely used in the diagnosis of virus diseases. In these circumstances reappraisals of the use of this test in certain bacterial infections have been made.[2,3,4] Its reacceptance has followed, not only because it is easy to perform, but especially because of the more informative interpretation of results which can now be made by the additional knowledge of the class of antibody involved in the test and of the presence of that antibody in relation to the disease. Currently we are studying the use of the test in other bacterial diseases.

Haemagglutination-inhibition test (HI). When diagnosis of a viral infection is urgent and the properties of the virus make the usual tests slow or inconclusive the ability of the virus to agglutinate red cells of a particular species can be useful. During infection antibodies develop in the serum which inhibit this

haemagglutination and these can be detected by the HI. This test is now applied widely to secure an indication of recent or past rubella infection in women in the early days of pregnancy and in screening tests before vaccination of women of mature age against rubella.

Fractionation procedures. The proportion of each class of specific immunoglobulin changes as a disease progresses. It is useful to be able to detect the different classes to give a pointer to the stage of the disease or past infection.

Fractionation of serum by ultracentrifugation in a density gradient separates the igM from the igG or igA. The fractions can then be tested for specific antibacterial or antiviral activity and the class of antibody involved in different serological tests studied.

Other methods of fractionation in use are separation by molecular size on Sephadex 150 or 200, and by ion exchange on Diethylaminoethyl Cellulose (DEAE) columns where the different immunoglobulins are eluted by buffers of different ionic strength. By using large columns, or a "batch method" of filtration on a Buchner funnel,[5] large quantities of serum can be separated and we are using the batch method for extraction of igG from sera to make an animal inoculum for the preparation of antispecies igG antisera for immunofluorescence.

The success of fractionation is checked by double diffusion in gel using anti-igG, anti-igA or anti-igM serum. The presence of the individual immunoglobulin in the expected fraction is demonstrated by a precipitin line between the fraction well and that of the anti-immunoglobulin reagent. A line of identity will appear with the precipitin line of an adjacent well containing a known pure immunoglobulin preparation. Alternatively proteins in a fraction are identified by immunoelectrophoresis. The fraction is placed in a well cut in a coating of agar on a slide and an electric current is passed along the agar. The separated proteins are then identified by cutting a ditch the length of the slide and placing in it an antiserum directed against whole serum. Diffusion will follow and precipitin arcs will be formed by the antiserum at the edges of each of the areas of protein. The position of the arcs indicate the nature of the protein under standard conditions.

Immunofluorescence. An organism and its immunological reaction are revealed quickly and simultaneously. In a direct method the igG fraction of an antiserum is extracted and conjugated with fluorescein isothyocyanate and the resulting conjugate used for staining the antigen. In the indirect technique the antigen is treated with whole homologous antiserum and the resulting antigen-antibody complex stained by an igG flourescein conjugate prepared from antiserum to igG of the same species as that of the homologous antiserum. This test may be used in two ways. In the first, an unknown antigen may be treated with known animal serum (*e.g.* rabbit or guinea pig) and then treated with anti-rabbit or anti-guinea pig igG fluorescein conjugate. Alternatively a known antigen may be treated with human serum in which we wish to detect homologous antibodies and in this case an anti-human igG conjugate is used.

The Standards Laboratory has recently been studying specificity and potency of anti-species immunoglobulin conjugates[6] and supplying suitable batches to

laboratories requiring these. We have also prepared some bacterial direct conjugates and are building up a supply of high titred specific viral sera for the middle layer of the indirect test.

Growth inhibition tests. One useful property of antisera to mycoplasmas is their ability to inhibit the growth of the organism in the absence of complement.[7] A growth-inhibition test was developed some years ago[8] in which filter paper discs, dried after impregnation with typing sera, were placed on a culture plate seeded with the mycoplasma culture to be identified. A measurable ring of inhibition of growth round a disc identified the type of organism. This method was taken up by the Standards Laboratory and, after a preliminary investigation of the use of the discs in a number of diagnostic laboratories,[9] it is now used routinely for mycoplasma identification.

Ultrasonication. Many CFTs in diagnosis involve the use of a single soluble antigen. A " cell pack " method followed by ultrasonication has increased the purity of soluble viral antigens prepared from infected tissue culture. The viral particles are discarded in the maintenance medium and the subsequent treatment by sonication breaks down the tissue culture cells more completely than other methods to release the soluble antigens.

References

1. Bradstreet, C. M. P. (1969). *J. Med. Microbiol.*, **2**, 419.
2. Reddin, J. L., Anderson, R. K., Jenness, R. and Spink, W. W. (1965). *New Engl. J. Med.*, **272**, 1263.
3. Combined Scottish Study (1970). *Brit. med. J.*, **4**, 637.
4. Bradstreet, C. M. P., Tannahill, A. J., Edwards, J. M. B. and Benson, P. F. *J. Hyg., Camb.* (in press).
5. Baumstark, J. S., Laffin, R. J. and Bardawil, W. A. (1964). *Archs. Biochem.* (Biophys.), **108**, 514.
6. Edwards, J. M. B. (1969). *J. Med. Microbiol.*, **2**, 555.
7. Edward, D. G. ff. and Fitzgerald, W. A. (1954). *J. Path. Bact.*, **68**, 23.
8. Stanbridge, E. and Hayflick, L. (1967). *J. Bact.*, **93**, 1392.
9. Dighero, M. W., Bradstreet, C. M. P. and Andrews, B. E. (1970). *J. appl. Bact.*, **33**, 750.

Brucellosis: Prospects and Problems

For the past four years the Ministry of Agriculture, Fisheries and Food and the Department of Agriculture for Scotland have organised voluntary schemes for eradication of brucellosis. For the most part these have been limited to herds which were either clear or nearly clear of infection. The aim was to set up reservoirs of brucella-free stock which would be available for replacements when compulsory eradication started. Such herds were often self-contained; and early applicants represented the larger and more progressive elements of the farming community. The response to the schemes has been such that something like one-third of the animals in the national herd (excluding steers) are now included in the voluntary schemes.

On 1st November, 1971 eradication began in three mainland areas of Great Britain. The first, in North-west England, included the whole of Westmorland

and a small part of Cumberland, West Yorkshire, and Lancashire north of the Lune. The second was on the West Scottish seaboard in Argyll and Bute; and the third was in South-west Wales, where a coast-to-coast corridor in Cardiganshire and Carmarthenshire was designated. Eradication was also started in certain Islands, including the Shetlands, the Uists and the Isle of Wight. In all these areas there is compulsory blood testing of all herds; and owners are being encouraged to join either the Brucellosis Incentive Scheme or a new Area Eradication Scheme, in which the provisions of compulsory eradication may be extended to participating herds. The second scheme offers special financial terms in the form of bonuses on milk or increased subsidies on beef and hill cows together with replacement for blood-test reactors.

In November 1972, compulsory slaughter of reactors will come into force; and thereafter other areas will be brought into the eradication programme. Norfolk and Suffolk have been announced as a new area in which eradication will begin in 1973. The Brucellosis Incentive Scheme, which is attracting an average of 2300 applicants each month will continue outside the eradication areas. The hope is that Great Britain will be brucella-free in 10–15 years. Northern Ireland is already in the last stages of the eradication programme. Eire has declared several of its northern counties brucella-free and has designated certain other counties as places where eradication is in progress.

However, the problem of acute brucellosis in man will be with us for at least ten years, although—as we hope—on a diminishing scale. The problem of so-called chronic brucellosis, whether it is a true chronic infection or a "hypersensitivity" reaction to antigenic components of brucellae, may well persist during the lifetime of those now in occupational contact with cattle.

Two particular problems merit the attention of clinical bacteriologists—namely, the low isolation rate of brucellae from blood culture and the interpretation of serological tests. Both of these problems have particular significance for the laboratory diagnosis of brucella infection in persons in occupational contact with cattle. Surveys of serum antibodies in veterinarians, farmers, farm workers, and abattoir workers have shown that high titres of agglutinating and complement-fixing antibodies may be present in fit persons. Conversely, even in cases proved by positive blood culture, the serum may be devoid of detectable agglutinating and complement-fixing antibodies.

It is regrettable that the sure diagnosis of brucella infection is so seldom made by isolating the organism from the patient. The rate of positive blood cultures is disappointingly low, probably not often as high as the figure of 15.9 per cent reported by Dalrymple-Champneys (1960). Reasons for failure may be chemotherapy, a medium which fails to grow brucellae, failure to incubate in 10 per cent CO_2, and failure to incubate the culture for long enough—up to 60 days may be necessary with subculture twice a week. Robertson's cooked meat medium or normal blood culture broth enriched with serum and glucose should be used and the batch should be checked for its capacity to support growth of brucellae, particularly the fastidious strain, *Brucella abortus*, biotype 2. *Brucella melitensis* is much more easily grown from blood than is *Brucella abortus*.

In cases of the acute disease in those who are not in contact with infected animals, the level of antibodies may be followed month by month and may

sometimes indicate the success or failure of antibiotic therapy. The complement-fixing antibodies are the first to show a fall in titre, but the levels fall slowly; and it may need from ten to twenty months for the *titre to fall to* 1 *in* 10 *or less*. The antibody levels of the other serological tests fall at a slower rate and agglutinating antibody titres of up to 1 in 160 may persist for several years.

The difficulty of diagnosis is greatest among those in occupational contact, many of whom will have raised antibody levels. A serological test which reliably indicates the presence of active disease has been much desired and eagerly sought; but it has not yet been found. It was previously thought that the results of the complement-fixation test might reflect the presence and activity of brucellae in the body; but this has recently been questioned by the finding that complement-fixing antibodies may be stimulated in animals by the subcutaneous inoculation of dead organisms. Two additional serological methods—immunofluorescent labelling and the titration of antibodies to brucella bacteriophage—have been employed in the diagnosis of acute infection, but their usefulness has not yet been established.

REFERENCE

Dalrymple-Champneys, W. (1960). Brucella infection and undulant fever in man. London, O.U.P., p. 96.

Why do we Escape Botulism

Botulism in humans and animals is almost invariably attributed to the ingestion of toxic substances, resembling the poison curare, produced in foods by the growth of *Clostridium botulinum* type A, B, C, D, E and F. Toxins from types A, B, E and F have killed many humans, toxins from types C and D affect animals.

Before considering the reasons why botulism has not been reported in Great Britain during the past 15 years it is worthwhile to recall incidents before 1955. The history of botulism from the A and B toxins includes many cases and outbreaks of meat and vegetable origin prior to 1925, when minimum processes were introduced by the National Canners' Association of the U.S.A. after outbreaks of botulism from canned foods including green beans, olives, spinach, beets and corn.

The commercial process used to render non-acid products safe with regard to *Cl. botulinum* is based upon laboratory experiments using heavy suspensions of spores of *Cl. botulinum* types A and B (Esty and Meyer, 1922).[1] The maximum thermal resistance of 10^{11} spores was found to be 2.78 min at 121° C. The minimum sterilising values used commercially for non-acid foods correspond to a 10^{12} inactivation of *Cl. botulinum* spores. Thus any spores of *Cl. botulinum* present will have a probability of survival of no greater than 1 in 10^{12}.

Yet accidents due to canned foods continued to occur in the U.S.A. Mushroom sauce (Geiger, 1941),[2] in 1942 beetroot (Gray, 1948)[4], in 1963 tuna fish (Johnston, Feldman and Sullivan, 1963)[5] and in 1971 potato-vegetable soup (Vichyssoise) (Morbidity and Mortality, 1971a)[7] caused cases and fatalities due

to *Cl. botulinum* types A, B or E. Gillespy (1966)[3] stated that the great majority of outbreaks have followed the consumption from home canned vegetables because vegetables are the commonest home-canned low acid foods.

As the spores of *Cl. botulinum* are likely to survive for many years in soil it is the " earthy " foods such as vegetables and not mammalian flesh which are likely to be the sources of botulism from types A and B.

Food canned in metal containers is not known to have caused botulism in the U.K. but there have been two outbreaks from food packed in glass containers, in 1922 the famous Loch Maree disaster from duck paste (Leighton, 1923)[6] and 1935 from nut meat brawn (Templeton, 1935).[9]

In countries where domestic canning and bottling and some other forms of preservation are practised on a small scale and encouraged by cookery books and demonstrations sporadic cases and family outbreaks of botulism are likely to continue. Amateur bottling and canning of non-acid foods is discouraged by Women's Organisations in Great Britain and cookery books which suggest such procedures have been banned. While strict commercial processes are applied the only danger from canned foods is leakage into the can of organisms from impure water or from hands during cooling in and after removal from the retort.

Canned foods such as hams and pork shoulders, although not stable on the shelf, apparently have an inbuilt inhibitory system which up to now has prevented the out growth of the few spores which may be present.

The spores of *Cl. botulinum* type E are less resistant to heat than are those of types A and B, and although incidents have come from canned foods botulism due to the type E toxin has another aetiological picture. Common in certain coastal areas the organism may be isolated from fish and sea mammals; and people eating raw, fresh, fermented, and smoked fish diets are prone to botulism from the type E toxin. Arctic countries, the U.S.S.R., Japan, the Great Lakes (U.S.A.), and even Denmark (smoked salmon) have suffered. Canned seafoods such as clams and crabs from Japan, sprats from Germany and smoked salmon from Labrador have been involved also.

The habits of eating in Great Britain do not include raw and fermented fish dishes so we have some measure of protection against type E botulism. But one views with suspicion the drying and smoking of fish taken from waters near areas known to have yielded *Cl. botulinum* type E from mud and water.

Recent outbreaks of " limberneck " in this country in broiler chickens, caused by *Cl. botulinum* type C, have given cause for concern. Though reports of human botulism due to type C toxin amount to only three single cases (France, the U.S.A. and the U.S.S.R.), the danger cannot be entirely ignored.

At present we appear to be escaping cases and fatalities from botulism; and this is probably due to three major factors.

(1) Strict commercial canning procedures.

(2) Discouragement of home preservation of non-acid foods.

(3) Absence of raw fish in the diet.

Prevention might be further assured if time/temperature and curing procedures for both shelf-stable and non-stable packed products were regulated and even more vigilance given to the types of foods and methods used in home preservation by heat.

It should be noted that six cases of botulism from wound infections have been reported in the U.S.A., the first in 1945 and the most recent in 1971 (Morbidity and Mortality 1971b).[8] Although no similar cases have been recorded outside the U.S.A. wound infection should be considered as a cause of clinical botulism in cases where foods cannot be incriminated.

References

1. Esty, J. R. and Meyer, K. F. (1922). The heat resistance of the spores of *B. botulinus* and allied anaerobes. *Journal of Infectious Diseases*, **31**, 650.
2. Geiger, J. C. (1941). An outbreak of botulism. *Journal American Medical Association*, **117**, 22.
3. Gillespy, T. G. (1966). (a) Sterilisation processes: their establishment and control. In: *The Safety of Canned Foods*. London: Royal Society of Health, p. 55.
4. Gray, D. F. (1948). Human botulism in Australia. *Medical Journal of Australia*, **2**, 37.
5. Johnston, R. W., Feldman, J. and Sullivan, R. (1963). Botulism from canned tuna fish. *Public Health Reports*, **78**, 561.
6. Leighton, G. R. (1923). Report of the circumstances attending the deaths of eight persons from botulism at Loch Maree (Ross-shire). Report of the Scottish Board of Health. Edinburgh: H.M. Stationery Office.
7. Morbidity and Mortality (1971a). Epidemiologic notes and reports: Botulism associated with commercially canned vichyssoise, New York. *Morbidity and Mortality Weekly Report*, **20**, 242.
8. Morbidity and Mortality (1971b). Epidemiologic notes and reports: Type A botulism from wound infection. Palo Alto., California. *Morbidity and Mortality Weekly Report*, **20**, 183.
9. Templeton, W. L. (1935). Two fatal cases of botulism. *British Medical Journal*, **ii**, 500.

Possible Ways of Expediting Diagnostic Work in Microbiology

By comparison with other branches of pathology, particularly chemical pathology, in which the routine work has been completely transformed during the last ten years by the advent of machines for doing tests and of computers for data processing, microbiology remains very much a cottage industry. In attempting to automate microbiology there are special problems related to the handling of living microbes and at first sight many of these problems appear almost impossible to solve economically. Possible ways of expediting diagnostic work in microbiology are nevertheless worth considering and exploration of the subject has already begun. The matter was discussed at a Symposium of the Royal College of Pathologists in 1969[1] and an up to date review by Trotman is currently in press.[2]

In addition to the Wassermann Reaction which is performed in large numbers each week in most hospital and public health laboratories, the complement fixation test has many applications in diagnostic microbiology and such a test would seem appropriate for some degree of mechanisation if not complete automation.[3] Apart from the use of mechanical aids such as dispensers and

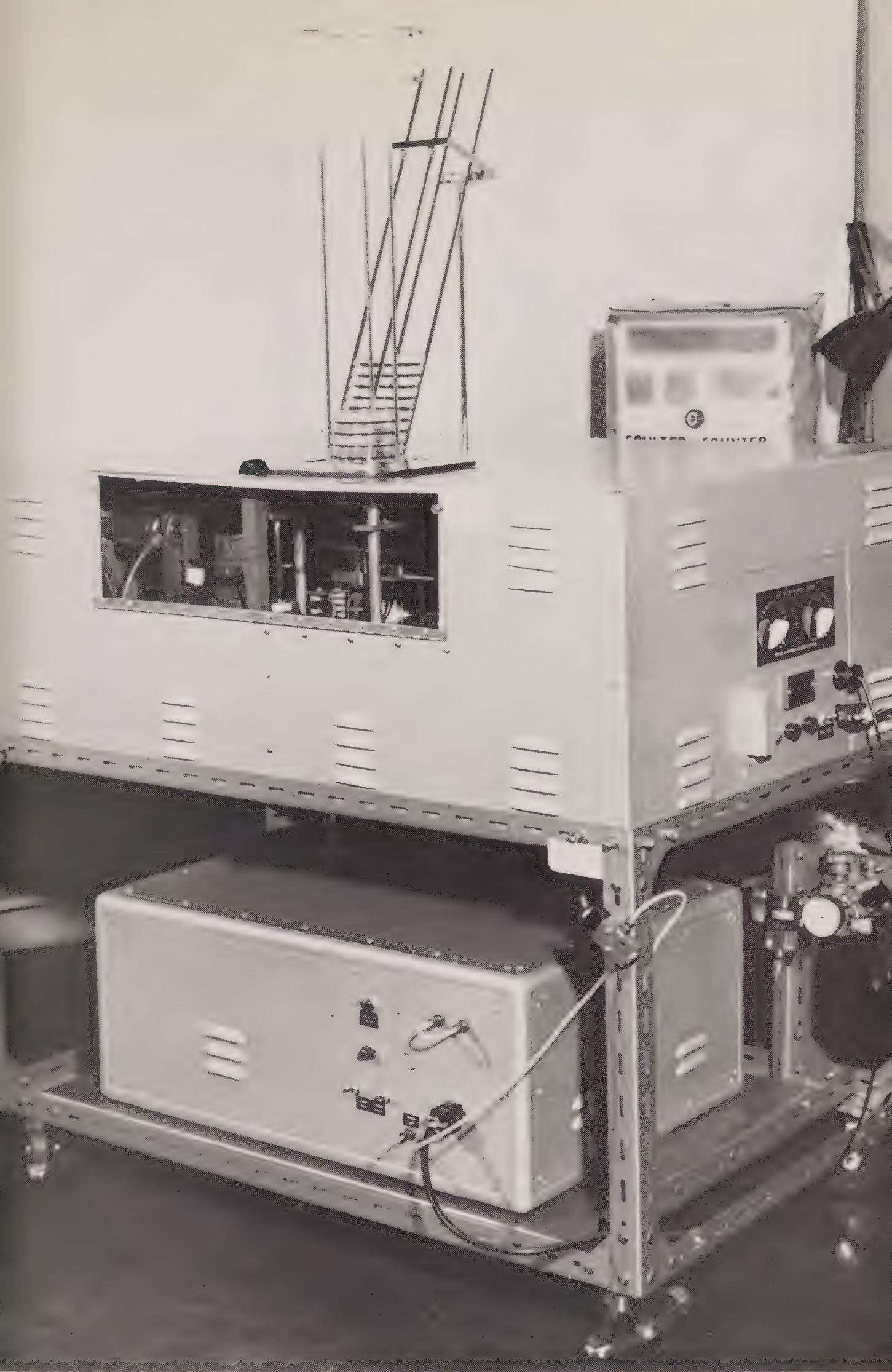


Figure 1.

Machine for the automatic spreading of bacterial inoculum over an agar plate. The illustration shows a holder into which inoculated plates are manually stacked, and a holder into which the agar plates are stacked after the inoculum has been spread.

See article on "Possible Ways of Expediting Diagnostic Work in Microbiology"—page 18.

Photograph by courtesy of R. E. Trotman, M.Sc., Ph.D., C.Eng., F.Inst.P., Wright-Fleming Institute, St. Mary's Hospital Medical School, London.

Figure 2. Photometric equipment for quantitative immunofluorescence studies. The illustration shows from left to right:

(1) power pack for the iodine quartz lamp;
(2) inverted microscope incorporating an iodine quartz lamp, an all-
(3) fibre optic lead;
(4) photomultiplier;

diluters, several groups of workers have tried to automate complement fixation tests by adapting equipment designed for work in chemical pathology.[4,5,6,7] Purpose-built equipment is currently under development in a joint project involving the P.H.L.S., the Department of Health and Social Security and a commercial firm.

The microscopical examination of Gram-stained smears of selected specimens at once upon their arrival in the laboratory can reveal diagnostically useful and sometimes life-saving information. In most diagnostic laboratories, because of the labour involved, too few of these examinations are routinely done in addition to the Gram-staining of films of colonies from cultures. It should not be particularly difficult to modify for Gram-staining a machine already available for the staining of blood films in haematology.*

To reduce the time and labour involved in preparing culture media from raw materials many laboratories of the Service now use commercially prepared media available in dehydrated form. Further savings may be achieved by the use of machines for dispensing media. Equipment used in the Media Department at Colindale can dispense agar medium into 700 plastic petri dishes per hour.

A machine which will inoculate culture plates with material collected on swabs, as well as spread the inoculum on the agar, is currently under development.[8,9]

Since it is now generally accepted that the bacteriological examination of urine requires quantitative evaluation there is clearly a need for automating this work. Attempts have been made, with varying degrees of success, to use an electronic particle counter such as is used for estimating numbers of red cells, white cells and platelets in blood samples. Equipment developed in the U.S.A. and based on a reaction between bacterial ATP, luciferin and luciferase, is claimed to be suitable for screening urine samples.†

Micro-enzymatic tests for identifying enterobacteria[10] have recently been facilitated by the introduction of commercially available disposable plastic trays containing the necessary substrates.‡ These trays are currently undergoing evaluation in the National Collection of Type Cultures.

The identification of enterobacteria and other Gram-negative taxa may be facilitated further by the use of programmes currently being developed in the Computer Trials Laboratory at Colindale.[11] In the course of this work diagnostic laboratories have been invited to submit results of tests. In return they receive a print-out indicating the most likely organisms with their probability values. If identification has not been achieved, further tests are recommended. This facility appears to have considerable potential for diagnostic laboratories especially if direct access to the Computer Laboratory by teleprinter became available.

---

*The Hema-Tek Slide Stainer. Ames Company, Division of Miles Laboratories Ltd., Stoke Court, Stoke Poges, Slough, Bucks.

†Dupont Luminescence Biometer.

‡The API System for the Identification of Enterobacteriaceae, Hughes & Hughes (Enzymes) Ltd., 12a High Street, Brentwood, Essex.

Counting bacterial colonies derived from water and food samples is time-consuming and subject to considerable error. Mechanical aids, including a manually operated probe connected to an electronic counter, have been available for some years but an electronic scanning device recently developed by a firm in the food industry might be applicable to the work of large public health laboratories. It might be possible to use a similar scanning device to detect tubercle bacilli in sputum but considerable research and development would be required.

Fluorescence microscopy is now employed routinely in many diagnostic laboratories to detect auramine-stained tubercle bacilli in sputum and, using fluorescein-labelled antibodies, *Shigella sonnei* and enteropathogenic strains of *Escherichia coli* in faeces, as well as syphilis, rubella and EB virus antibodies in serum. The application of immunofluorescence to the detection of viruses in cell cultures and even in clinical specimens has already been shown to be practicable.[12,13]

The recent development of equipment for measuring immunofluorescence emission from single organisms by means of a fibre optic probe[14] should enable quantitation of reagents and titration end-points to be assessed with greater accuracy and precision.

Electron microscopy is well established as an aid to the differential diagnosis of vesicular skin rashes[15] and is now proving useful more generally for detecting and identifying viruses in clinical specimens as well as in cell cultures.

In view of the vast numbers of antimicrobial drug sensitivity tests carried out daily in diagnostic laboratories it might be expected that automated methods would be of great value but little advance has yet been made in this field. However, a means of assaying gentamicin in a patient's serum in a matter of three hours has recently been described.[16]

In recent years data processing in chemical pathology has paved the way for better handling of information in microbiology. A computer already installed for chemical pathology has been used to produce laboratory reports in bacteriology, and data stored in the computer have been recalled in the form of tables to show the distribution of various organisms in the hospital wards.[17]

Like other scientific disciplines, medical microbiology is seemingly an ever-expanding subject. Manpower is scarce and costly. If the Service is to continue to meet its obligations with resources available, there is a need to explore and develop ways of expediting diagnostic work in microbiology.

References

1. Symposium of the Royal College of Pathologists (1969). *J. clin. Path.*, 22 *suppl.* (*Coll. Path.*), No. 3.
2. Trotman, R. E. *Biomedical Engineering* (in press).
3. Taylor, C. E. D. (1969). *J. clin. Path.*, 22 *suppl.* (*Coll. Path.*), No. 3, 14.
4. Pugh, V. W. and Gaze, R. W. T. (1966). *J. clin. Path.*, **19**, 595.
5. Taylor, C. E. D., Kershaw, J. W. and Heimer, G. V. (1968). *J. clin. Path.*, **21**, 521.
6. Vargues, R., Studievic, C. and Maupas, Ph. (1970). *J. clin. Path.*, **23**, 540.
7. Taylor, C. E. D. and Challand, B. J. Submitted for publication.
8. Trotman, R. E. (1971). *J. appl. Bact.*, **34** (in press).
9. Trotman, R. E. (1971). Personal communication.
10. Cowan, S. T. and Steel, K. J. (1965). *Manual for the Identification of Medical Bacteria.* Cambridge University Press, p. 166.

11. Lapage, S. P., Bascomb, S., Willcox, W. R. and Curtis, M. A. (1970). In: *Automation, mechanisation and data handling in microbiology*, edited by A. Baillie and R. J. Gilbert. London, Academic Press, p. 1.
12. Gardner, P. S. and McQuillin, J. (1968). *Brit. med. J.*, **3**, 340.
13. McQuillin, J., Gardner, P. S. and McGuckin, R. (1970). *Lancet*, **ii**, 690.
14. Taylor, C. E. D., Heimer, G. V. and Lidwell, O. M. (1971). *Lancet*, **i**, 785.
15. Macrae, A. D., Field, A. M., McDonald, J. R., Meurisse, E. V. and Porter, A. A. (1969). *Lancet*, **ii**, 313.
16. Noone, P., Pattison, J. R. and Samson, D. (1971). *Lancet*, **ii**, 16.
17. Whitby, J. L. and Blair, J. N. (1970). In: *Automation, mechanisation and data handling in microbiology*, edited by A. Baillie and R. J. Gilbert. London, Academic Press, p. 28.

Outbreaks of Conjunctivitis

One of the preventable iatrogenic diseases is epidemic keratoconjunctivitis due to adenovirus type 8. In Western countries the spread of this virus from patient to patient is almost always by medical personnel, probably *via* fingers[1] or tonometers.[2–4] This has been known since the original work of Jawetz in 1955 with " Shipyard eye ".[5] Nevertheless, outbreaks of medically-spread keratoconjunctivitis due to this virus continue to appear in the ambulance rooms of metal industries and in ophthalmic clinics.[1,3,4,6–8] Outbreaks affected the shipyards on the River Clyde in 1956,[9] 1967, and 1968;[11] and another started in June 1971. Later in 1971 outbreaks appeared in several large centres in England.

In one of these outbreaks there were some 40 cases of keratoconjunctivitis in which a type-8 adenovirus infection was proved. Infection was acquired in the casualty or out-patient departments of the eye hospital by patients attending with glaucoma or foreign bodies in the eye. Many had been subjected to tonometry. Two junior medical officers who acquired the infection but continued on duty were probably a potent source of infection.[6] A small secondary outbreak of seven cases appeared in a hospital for high-grade mentally defective women, one of whom had acquired the infection in the eye hospital. Of 29 other hospital-acquired cases, six patients transmitted the infection to close family contacts.[8,11,12] It is possible that the local treatment of many of the patients with steroids increased the amount of virus in the eye, and hence the spread to contacts. As others have found, there was no spread to less close contacts.

Adenovirus type 8 is difficult to grow in the laboratory, for it multiplies extremely slowly in tissue culture. In the present outbreak, human embryo kidney tissue cultures were found to be better than HeLa cell or human embryo fibroblast cultures. The haemagglutination-inhibition test with group O human red cells for adenovirus type 8 antibodies[13] was found to be very useful and easy to perform. Antibodies appeared in all patients from whom the virus was isolated. As has been found in other Western countries,[14] haemagglutination-inhibiting antibodies to type 8 adenovirus were rarely detected in the general population.

In adenovirus type 8 keratoconjunctivitis very little virus is present in the eye secretions, and the virus most readily infects eyes which have already been damaged. Hence its spread among metal workers, who get foreign bodies in the eye, or among very close family contacts, and its apparent disappearance between epidemics.[10] It would be interesting to discover where the virus goes between epidemics, for in Western countries there does not seem to be a reservoir in children's throats as is found in the East.[5,15]

Corneal lesions are frequently caused by this virus, and in the present outbreak many patients had uveitis and opacities deep on the back of the cornea. Opacities may persist for up to three years.[2] It is important, therefore, for aseptic techniques in ophthalmic clinics to be kept up to the mark by cross-infection officers. Adenovirus type 8 is tough and survives drying and room temperature for some days. Some instruments such as tonometers are difficult to sterilise because of the materials from which they are made. Ether or ultraviolet light have been proved not to kill the virus on tonometers.[2,3] Heat (for metal tonometers) or soap-and-water, or 5 per cent chloramine (for plastic tonometers) or a disposable sheath, have been recommended.[4,8] The chief factor in bringing the present outbreak under control was probably the segregation of all cases to a special clinic held on Saturday mornings. Unfortunately these outbreaks are not immediately recognised, since the incubation period is long. The tell-tale corneal opacities do not appear until two weeks after onset, and it is many weeks before the virus grows in culture and so may be identified.

References

1. Dawson, C. R., Hanna, L., Wood, T. R. and Despain, R. (1970). *Amer. J. Ophthal.*, **69**, 473.
2. Davidson, S. I. (1964). *Brit. J. Ophthal.*, **48**, 573.
3. Berg, R. and Ringström, C-B. (1969). *Scand. J. infect. Dis.*, **1**, 153.
4. Wegman, D. H., Guinee, V. F. and Millian, S. J. (1970). *Amer. J. publ. Hlth*, **60**, 1230.
5. Jawetz, E. (1959). *Brit. med. J.*, **1**, 873.
6. Dawson, C. and Darrell, R. (1963). *New Engl. J. Med.*, **268**, 1031.
7. Laibson, P. R., Ortolan, G. and Dupré-Strachan, S. (1968). *Arch. Ophthal., N.Y.*, **80**, 467.
8. Svartz-Malmberg, G. and Germanis, M. (1969). *Scand. J. infect. Dis.*, **1**, 161.
9. Sommerville, R. G. (1958). *J. Hyg., Camb.*, **56**, 101.
10. Grist, N. R., Bell, E. J. and Gardner, C. A. (1970). *Hlth Bull., Edin.*, **28**, 47.
11. Dawson, C., Darrell, R., Hanna, L. and Jawetz, E. (1963). *New Engl. J. Med.*, **268**, 1034.
12. Dawson, C., Jawetz, E., Hanna, L., Winn, W. E. T. and Thompson, C. (1960). *Amer. J. Hyg.*, **72**, 279.
13. Bell, E. J., Martin, K. W. and Ross, C. A. C. (1969). *J. med. Microbiol.*, **2**, 125.
14. Jung, D. and Wigand, R. (1967). *Amer. J. Epidem.*, **85**, 311.
15. Mitsui, Y., Tanaka, C. and Yamashita, K. (1955). *Amer. J. Ophthal.*, **39**, 540.

Maintenance of Lactobacilli in the Intestines of Infants Fed Artificially

For many years the advocates of breast milk have pressed the merits of this method of infant feeding on an increasingly unresponsive maternal public. Despite the undeniable advantages of its container, the other "invisible" benefits of breast milk have been largely ignored by new mothers. Understandably, they are attracted by the convenience of the artificial feed. Although the argument may be regarded as teleological, it seems reasonable to suppose that human milk must be better for humans than cows' milk. If this is so, it seems

equally reasonable that artificial feeds should be made to resemble human milk as closely as possible.

Among the many important direct and indirect differences between human milk and preparations of cows' milk, the one that strikes the bacteriologist most forcibly is the relative resistance of breast-fed infants to gastroenteritis. Thus, in the United Kingdom, gastroenteritis due to enteropathogenic *E. coli* predominantly affects bottle-fed infants; and in the areas of the world where cholera is endemic, clinical cholera is rare in breast-fed babies. Various explanations have been advanced to account for this obvious advantage of breast feeding. These include the passive transfer of antibodies in colostrum, contamination of artificial feeds during preparation, and the nature of the infant's own intestinal environment.

Typically, the faeces from the artificially fed infant have a high pH (6.5), a high coliform count, and a low lactobacillus count; whereas those from the breast-fed child have a low pH (5.0), a relatively low coliform count, and a high lactobacillus count. Ross and Dawes (1954)[1] concluded that the preponderance of lactobacilli in the faeces of breast-fed infants and the relatively low pH of the large bowel content were the main factors responsible for natural resistance to enteric infections. Because they found that oral feeds of lactose had only a partial and temporary effect in reducing the pH of the faeces of artificially fed babies, they suggested that human milk must contain another factor necessary for the maintenance of an acid pH and a lactobacillary flora.

The results of recent in-vitro investigations (Bullen and Willis, 1971)[2] support the observations and conclusions of Ross and Dawes, and point to the importance of the composition and properties of cows' milk, which seem to provide an intestinal content that is unfavourable both to the growth of lactobacilli and to the production of an acid environment. It is suggested that important factors in breast milk include its high lactose content, low protein content, low phosphate content, and its poor buffering capacity. Importance is also attached to the fact that breast milk seems to provide a fluid feed of small bulk and low residue, and that its use is unlikely to include periods of starvation. Cows' milk, on the other hand, which has a low lactose content, high protein content, high phosphate content, and a high buffering capacity, is a relatively bulky, high-residue feed. Feeding regimens which employ cows' milk are likely to include periods of starvation. Such differences between breast and artificial feeding are considered to be important predisposing factors in the sequence of events that finally determines resistance or susceptibility of the normal infant to infective gastroenteritis.

Recently an artificial feed has been devised which mimics breast milk in its content of total protein, fat, carbohydrate, and phosphorus. Perhaps more important, it resembles breast milk in its poor buffering capacity. In-vitro experiments have shown that this material facilitates the growth of lactobacilli and produces an environment that is unfavourable to the growth of *E. coli*. Feeding trials are now in hand with a view to producing a breast-fed type of faecal flora and large bowel environment in bottle-fed babies.

References

1. Ross, C. A. C. and Dawes, E. A. (1954). "Resistance of the breast-fed infant to gastroenteritis." *Lancet*, **1**, 994.
2. Bullen, C. L. and Willis, A. T. (1971). "Resistance of the breast-fed infant to gastroenteritis." *Brit. med. J.*, **3**, 338.

DIRECTORY OF THE PUBLIC HEALTH LABORATORY SERVICE

1972

LONDON	
COLINDALE	NW9 5HT
Central Middlesex Hospital	NW10 7NS
Neasden	N.W.10
County Hall	S.E.1
Tooting	S.W.17
Whipps Cross	E11 1MR

DIRECTORY OF THE SERVICE

HEADQUARTERS ADMINISTRATIVE OFFICE

24 Park Crescent, London, W1N 4DA

Tel.: 01-636 2223

Sir James Howie, LL.D., M.D., F.R.C.P., F.R.C.Path. (*Director of the Service*)
J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact. (*Deputy Director of the Service*) (*see also page* 38)
J. D. Whittaker, M.B.E. (*Secretary of the Board*)
R. H. Westlake (*Finance Officer and Deputy Secretary of the Board*)
J. W. Bushell (*Establishments Officer*)
R. V. Jackson (*Accountant and Supplies Officer*)

*A. Waltho (*Officer in Charge*), MRC Central Store, Colindale Avenue, London, NW9 5HT. *Tel.:* 01–205 0071

CENTRAL PUBLIC HEALTH LABORATORY

Colindale Avenue, London, NW9 5HT
Tel.: 01-205 7041
Telegraphic Address: Defender London NW9 5HT

Administration and Central Services

†E. S. Anderson, M.D., F.R.C.Path., Dip.Bact., F.R.S. (*Administrative Director:* *see also page* 38)
†B. Rowe, M.A., M.B., D.T.M (*Deputy Administrative Director:* *see also page* 39)
H. L. Lloydbottom, A.H.A. (*Administrator*)
Mrs. Hilary M. Leavens, B.Sc. (*Acting Production Manager, Media Department*)

Central Library

Miss Betty H. Whyte, M.A., A.L.A. (*Librarian*)
Mrs. Dorothy A. McLennan, M.A., A.L.A. (*Assistant Librarian*)
Mrs. Margaret A. Cowperthwaite, A.L.A. (*Assistant Librarian*)

---

*Member of the staff of the Medical Research Council.
†These appointments are now held on a rotating basis.

CONSTITUENT PUBLIC HEALTH LABORATORIES

Specimens must be submitted by doctors, veterinarians, dentists, public health inspectors, and others acting on behalf of medical officers of health, Government departments, or representatives of other official bodies, and are received, in the first instance, at one of the laboratories listed below. Specimens cannot be accepted from private persons.

REGIONAL LABORATORIES

BIRMINGHAM:

Public Health Laboratory, East Birmingham Hospital, Bordesley Green East, Birmingham, B9 5ST.
Tel.: 021-772 4311, Ext.680

J. G. P. Hutchison, M.D., F.R.C.P. (Glasg.), M.R.C.Path. (*Director*)
*F. A. J. Bridgwater, M.B., M.R.C.Path., Dip.Bact. (*Deputy Director*)
P.D. Littlejohns, F.I.M.L.T. (*Head Technician*)
D. McGhie, M.B.
M. J. Robertson, M.R.C.S., D.T.M. & H., Dip.Bact.
G. Tebbutt, B.Sc.

CAMBRIDGE:

Public Health Laboratory, Tennis Court Road, Cambridge, CB2 1QR.
Tel.: Cambridge (STD 0223) 55526 and 57573

G. R. E. Naylor, M.D., F.R.C.P., M.R.C.Path. (*Director*)
Miss Joan M. Boissard, M.R.C.S. (*Deputy Director*)
H. W. K. Fell, M.B., Dip.Bact.
J. Nagington, M.D., Dip.Bact.
V. C. T. Rolfe, F.I.M.L.T. (*Head Technician*)

BRISTOL:

Public Health Laboratory, Myrtle Road, Kingsdown, Bristol, BS2 8EL
Tel.: Bristol (STD 0272) 21326

H. R. Cayton, M.B., F.R.C.Path. (*Director*)
Miss Suzanne K. R. Clarke, M.D., M.R.C.Path. (*Deputy Director*)
W. K. Paver, B.Sc.
Mrs. Shirley J. Richmond, B.A., M.B. (*part-time*)
R. Shannon, F.I.M.L.T. (*Head Technician*)

CARDIFF:

Public Health Laboratory, University Hospital of Wales, Heath Park, Cardiff, CF4 4XW
Tel.: Cardiff (STD 0222) 755944

C. H. L. Howells, B.Sc., M.D., F.R.C.Path. (*Director*)
A. D. Evans, M.B., B.Sc., M.R.C.Path., Dip.Bact.
R. W. S. Harvey, B.Sc., M.D., F.R.C.Path., Dip.Bact. (*Deputy Director*)
D. H. M. Joynson, M.B., M.R.C.P.
Miss Julia A. Munro (Mrs. Price), M.B,. M.R.C.S.
T. H. Price, F.I.M.L.T. (*Head Technician*)

---

*Consultant Microbiologist employed by the Birmingham Regional Hospital Board (*see* p. 42).

LEEDS:

Public Health Laboratory, Bridle Path, York Road, Leeds, LS15 7TR
Tel.: Leeds (STD 0532) 645011

G. B. Ludlam, M.D., F.R.C.Path., D.T.M. & H., D.L.O. (*Director*)
Mrs. P. Suzanne Dalton, Ph.D.
P. A. Graves, B.Sc.
M. H. Hambling, M.D., M.R.C.Path., D.(Obst.) R.C.O.G., Dip.Bact. (*Deputy Director*)
W. R. Ivory-Hollingsworth, F.I.M.L.T. (*Head Technician*)
K. Mohamed, B.Sc.
M. G. Mucklow, M.B.

MANCHESTER:

Public Health Laboratory, Withington Hospital, Manchester, M20 8LR
Tel.: 061-445 2416

J. O'H. Tobin, B.M., F.R.C.Path., M.R.C.P., Dp.Bact. (*Director*)
J. D. Abbott, M.D., M.R.C. Path. Dip.Bact. (*Deputy Director*)
J. E. Cradock-Watson, B.M.
L. M. de Silva, M.B., Dip.Bact.
D. M. Jones, M.D., M.R.C.Path., Dip.Bact.
Miss Margaret E. Macaulay, M.B., Dp.Bact.
Mrs. Helen McDonald, M.B. (*part-time*)
Miss Angela H. Pykett, M.B.
Mrs. Janet E. Robinson, B.Sc.
L. E. Simmons, F.I.M.L.T. (*Head Technician*)
Miss Joan M. Watkinson, B.Sc.

LIVERPOOL:

Public Health Laboratory, Fazakerley Hospital, Lower Lane, Liverpool, L9 7AL
Tel.: 051–525 2323

G. C. Turner, M.D., F.R.C.Path. (*Director*)
Miss Elizabeth C. Armstrong, M.D., M.R.C.Path., Dip.Bact. (*Deputy Director*)
C. I. Ashton, B.Sc.
Miss Margery B. Baillie, M.Sc., Ph.D.
Mrs. Helen T. Green, M.D.
R. Harper, F.I.M.L.T. (*Head Technician*)
C. Roberts, B.Sc., M.D.
Mrs. Dawn Stancliffe, B.Sc.
G. B. B. White, M.R.C.S., M.R.C.Path. Dip.Bact.

NEWCASTLE:

Public Health Laboratory, Institute of Pathology, General Hospital, Westgate Road, Newcastle upon Tyne, NE4 6BE
Tel.: Newcastle (STD 0632) 38811, Ext. 297

J. H. Hale, O.B.E., M.D., F.R.C.Path., M.R.C.P. (*Director*)
A. A. Codd, M.D., Dip.Bact.
J. A. Hall, F.I.M.L.T. (*Head Technician*)
G. E. Rich, M.B., Dip.Bact.
*J. B. Selkon, M.B., M.R.C.Path., D.C.P. (*Deputy Director*)

*Consultant Microbiologist employed by the Newcastle Regional Hospital Board (*see* p. 43).

OXFORD:

Public Health Laboratory, Radcliffe Infirmary, Oxford, OX2 6AH

Tel.: Oxford (STD 0865) 49231/2

H. H. Johnston, M.A., D.Phil. (*Acting Director*)
R. T. Mayon-White, M.B., M.R.C.P.
A. Peacock (*Head Technician*)
M. Severn, M.B., M.R.C.Path.
A. H. Tomlinson, M.A., D.Phil.

SHEFFIELD:

Public Health Laboratory, Northern General Hospital, Herries Road, Sheffield, S5 7AU

Tel.: Sheffield (STD 0742) 387253

E. H. Gillespie, M.B., F.R.C.Path. (*Director*)
A. E. Jephcott, M.A., M.B., M.R.C.Path., Dip.Bact.
W. A. Sutcliffe, F.I.M.L.T. (*Head Technician*).
A. B. White, M.B., Dip.Bact.
Miss Margaret A. M. Wilson, M.B., M.R.C.Path., Dp.Bact. (*Deputy Director*)

AREA LABORATORIES

BATH:

Public Health Laboratory, Royal United Hospital, Combe Park, Bath, BA1 3NG

Tel.: Bath (STD 0225) 24624

P. G. Mann, M.D., M.R.C.Path., Dip.Bact. (*Director*)
Mrs. Monica Lloyd, M.B. (*part-time*)
D. W. Marshall, F.I.M.L.T. (*Head Technician*)

BRADFORD:

Public Health Laboratory, 16–18 Edmund Street, Bradford BD5 0BH

Tel.: Bradford (STD 0274) 24314

H. G. M. Smith, M.B., Ph.D., Dip.Bact. (*Director*)
M. Peel, F.I.M.L.T. (*Head Technician*)

BEDFORD:

Public Health Laboratory, General Hospital, Kimbolton Road, Bedford

Tel.: Bedford (STD 0234) 51707

W. F. Lane, M.B., M.Sc., F.R.C.Path., D.P.H. (*Director*)
J. Marshall, F.I.M.L.T. (*Senior Technical Officer*)

BRIGHTON:

Public Health Laboratory, Royal Sussex County Hospital, Brighton, BN2 5BE

Tel.: Brighton (STD 0273) 63506

J. E. Jameson, M.R.C.S. (*Director*)
N. W. Emberley, A.I.M.L.T. (*Head Technician*)

CARLISLE:

Public Health Laboratory, Cumberland Infirmary, Carlisle

Tel.: Carlisle (STD 0228) 23654 or 23444

D. G. Davies, M.D., F.R.C.Path. Dip.Bact. (*Director*)
A. R. Wood, F.I.M.L.T. (*Head Technician*)

CARMARTHEN:

Public Health Laboratory, West Wales General Hospital, Glangwili, Carmarthen

Tel.: Carmarthen (STD 0267) 7271

H. D. S. Morgan, M.R.C.S., F.R.C.Path., Dip.Bact. (*Director*)
G. Davies, A.I.M.L.T. (*Head Technician*)

CHELMSFORD:

Public Health Laboratory, Chelmsford and Essex Hospital, New London Road, Chelmsford

Tel.: Chelmsford (STD 0245) 52922 or 65234

R. Pilsworth, M.D., Dip.Bact. (*Director*)
P. Maybury, F.I.M.L.T. (*Head Technician*)

CHESTER:

Public Health Laboratory, Chester City Hospital, Hoole Lane, Chester, CH2 3EG

Tel.: Chester (STD 0244) 21417

Miss Pauline M. Poole, M.D., M.R.C.Path., B.A.O., Dip.Bact. (*Director*)
D. Breckon, F.I.M.L.T. (*Head Technician*)

CONWAY:

Public Health Laboratory, "Bryn Hyfryd", Conway

Tel.: Conway (STD 0492-63) 2478

A. J. Kingsley Smith, B.M., M.R.C.Path. (*Director*)
P. W. W. Griffiths, M.B., M.R.C.Path., Dip.Bact. (*Deputy Director*)
K. L. Thomas F.I.M.L.T. (*Head Technician*)

COVENTRY:

Public Health Laboratory, Coventry and Warwickshire Hospital, Stoney Stanton Road, Coventry, CV1 4FH

Tel.: Coventry (STD 0203) 25937 and 24055

J. E. M. Whitehead, M.A., M.B., F.R.C.Path., Dip.Bact. (*Director*)
M. W. Scruton, F.I.M.L.T. (*Head Technician*)
Miss Irene Thangkhiew (Mrs. Loines), M.Sc., M.B., Dip. Bact.

DERBY:

Public Health Laboratory, 121a Osmaston Road, Derby, DE1 2GB

Tel.: Derby (STD 0332) 41513

B. W. Barton, M.B., M.R.C.Path., Dip.Bact. (*Director*)
Mrs. Evelyn M. Finnie, M.D., M.Sc.
G. F. Johnstone, F.I.M.L.T. (*Head Technician*)

DORCHESTER:

Public Health Laboratory, Glyde Path Road, Dorchester

Tel.: Dorchester (STD 0305) 4478

G. H. Tee, F.R.C.Path., M.R.C.S., Ph.D. (*Director*)
E. F. C. Coetzee, F.I.M.L.T. (*Head Technician*)

EPSOM:

Public Health Laboratory, West Park Hospital, Epsom

Tel.: Epsom 01-39 26633

D. R. Gamble, M.B., M.R.C.Path., Dip.Bact. (*Director*)
C. H. Bullin, F.I.M.L.T. (*Head Technician*)
N. J. Mitchell, M.B., M.R.C.S., M.R.C.Path., Dip.Bact.
Miss Elizabeth I. Tanner, M.B., M.R.C.Path., Dip.Bact. (*Deputy Director*)

EXETER:

Public Health Laboratory, Church Lane, Heavitree, Exeter, EX2 5AD

Tel.: Exeter (STD 0392) 77833

B. Moore, M.D., B.Sc., F.R.C.Path., (*Director*)
R. Y. Cartwright, M.B.
R. J. C. Hart, M.B., M.R.C.S., M.R.C.Path., Dip.Bact. (*Deputy Director*)
D. T. Lansdowne, F.I.M.L.T. (*Head Technician*)
W. J. Ryan, M.B., D.P.H., Dip.Bact.

GLOUCESTER:

Public Health Laboratory, Gloucestershire Royal Hospital, Southgate Street, Gloucester

Tel.: Gloucester (STD 0452) 21021

A. E. Wright, T.D., M.D., M.R.C.Path., D.P.H., Dip.Bact. (*Director*)
G. Spence, F.I.M.L.T. (*Head Technician*)
G. E. D. Urquhart, M.B., M.R.C.Path.

GUILDFORD:

Public Health Laboratory, St. Luke's Hospital, Guildford

Tel.: Guildford (STD 0483) 66091

Miss Joan R. Davies, M.D., Dip.Bact. (*Director*)
C. Dulake, M.B., M.R.C.Path., Dip.Bact. (*Deputy Director*)
Miss Sheila Payne, B.Sc.
A. J. Smith, F.I.M.L.T. (*Head Technician*)

HEREFORD:

Public Health Laboratory, County Hospital, Hereford

Tel.: Hereford (STD 0432) 4696

D. R. Christie, M.B., Dip.Bact. (*Director*)
G. W. Taylor, F.I.M.L.T. (*Head Technician*)

HULL:

Public Health Laboratory, Hull Royal Infirmary, Anlaby Road, Hull

Tel.: Hull (STD 0482) 23046

J. H. McCoy, M.B., D.P.H. (*Director*)
R. Darnell, M.B.
G. E. Spain, F.I.M.L.T. (*Head Technician*)

IPSWICH:

Public Health Laboratory, Woodbridge Road East, Ipswich, IP4 5PE

Tel.: Ipswich (STD 0473) 77261/2

P. K. Fraser, M.D., F.R.C.Path., M.R.C.P. (*Director*)
A. H. Durrant, F.I.M.L.T. (*Head Technician*)

LEICESTER:

Public Health Laboratory, Groby Road Hospital, Leicester, LE3 9QE

Tel.: Leicester (STD 0533) 872283

N. S. Mair, M.B., F.R.C.Path., D.C.H., D.P.H., Dip.Bact. (*Director*)
E. Fox, F.I.M.L.T. (*Head Technician*)
Mrs. Hélène J. Mair, M.D., M.R.C.Path., Dip.Bact.

LINCOLN:

Public Health Laboratory, St. Anne's Road, Lincoln
Tel.: Lincoln (STD 0522) 28607

J. G. Wallace, B.M., M.R.C.Path., D.C.P., Dip.Bact. (*Director*)
R. Clark, F.I.M.L.T. (*Head Technician*)

LONDON:

CENTRAL MIDDLESEX HOSPITAL

Public Health Laboratory, Central Middlesex Hospital, Acton Lane, Park Royal, London, NW10 7NT
Tel.: 01-965 5733

Neasden Hospital, Brentfield Road, London, N.W.10
Tel.: Willesden (STD 01-459) 1422

C. E. D. Taylor, M.A. M.D., F.R.C.Path., Dip.Bact. (*Director*)
Mrs. Beryl J. Challand, B.Sc.
G. V. Heimer, F.I.M.L.T. (*Technical Officer*)
E. M. McKay-Ferguson, M.B., M.R.C.S.
*D. A. McSwiggan, L.R.C.P.I., M.R.C.Path., D.T.M. & H., Dip.Bact. (*Deputy Director*)
Miss Stella Parrack (Mrs. Goldberg), M.B., D.R.C.O.G. (*part-time*)
A. F. M. S. Rahman, M.B., L.M.S.S.A., M.R.C.Path., D.P.H., D.T.M.&H., Dip.Bact.

COUNTY HALL, S.E.1

Bacteriological Laboratory (P.H.L.S.), Room 617, County Hall, Westminster Bridge, London, S.E.1
Tel.: 01-928 3467

Mrs. Anne H. C. Uttley, M.B., Ph.D., M.R.C.Path., Dip.Bact. (*Acting Director*)
C. H. Collins, M.I.Biol., F.I.M.L.T. (*Senior Technical Officer*)
W. N. Farrant, F.I.M.L.T. (*Head Technician*)

LONDON (*continued*):

TOOTING, S.W.17

Public Health Laboratory, St. George's Hospital, Tooting Grove, London, S.W.17
Tel.: 01-672 1255

D. G. Fleck, M.D., M.R.C.Path., Dip.Bact. (*Director*)
B. S. Chessum, F.I.M.L.T. (*Head Technician*)
Miss Helen G. Ross, M.B., D.T.M. & H., Dip.Bact.

WHIPPS CROSS, E.11

Public Health Laboratory, Whipps Cross Hospital, Whipps Cross Road, London, E11 1NR
Tel.: 01-539 5223

B. T. Thom, M.B., M.R.C.Path., Dip.Bact. (*Director*)
D. B. McGechie, M.B., M.R.C.S.
J. N. Pilfold, F.I.M.L.T. (*Head Technician*)

LUTON:

Public Health Laboratory, Luton and Dunstable Hospital, Lewsey Road, Luton, LU4 0DZ
Tel.: Luton (STD 0582) 52007

A. T. Willis, M.D., Ph.D., D.Sc., M.R.A.C.P., M.R.C.Path., M.C.P.A. (*Director*)
Mrs. Catherine L. Bullen, M.R.C.V.S.
R. Burt, F.I.M.L.T. (*Head Technician*)
Miss Susan E. J. Young, B.A., M.B., M.R.C.P., B.A.O., D.C.H.

*Consultant Microbiologist employed by the North-West Metropolitan Regional Hospital Board (*see* p. 43).

MAIDSTONE:

Public Health Laboratory, Preston Hall, Maidstone

Tel.: Maidstone (STD 0622) 77155

A. L. Furniss, M.D., Dip.Bact. (*Director*)
T. J. Donovan, F.I.M.L.T. (*Head Technician*)
Miss Ruth C. J. James (Mrs. Barkhan), M.B., M.R.C.Path., Dip.Bact. (*part-time*)
L. Poudayl, M.B., D.C.P., Dip.Bact.

MIDDLESBROUGH:

Middlesbrough is now part of the County Borough of Teesside, and in future will be listed as TEESSIDE

NEWPORT (Mon.):

Public Health Laboratory, Clytha Square, Newport, NPT 2TZ

Tel.: Newport (STD 0633) 63248

R. D. Gray, M.D., F.R.C.Path., D.P.H. (*Director*)
G. H. Lowe, F.I.M.L.T. (*Technical Officer:* holder of collection of type cultures of *Trichomonads*)

NORTHAMPTON:

Public Health Laboratory, General Hospital, Northampton, NN1 5BD

Tel.: Northampton (STD 0604) 34347

L. Hoyle, M.B. (*Director*)
F. N. Cannon, F.I.M.L.T. (*Head Technician*)

NORWICH:

Public Health Laboratory, Bowthorpe Road, Norwich, NOR 22H

Tel.: Norwich (STD 0603) 28145

Miss Lynette M. Dowsett, M.D., F.R.C.Path. (*Director*)
Miss Margaret Fitt, B.Sc.
T. D. F. Money, M.A., M.B., D.Obst. R.C.O.G. (*part-time*)
C. W. Sivell, F.I.M.L.T. (*Head Technician*)

NOTTINGHAM:

Public Health Laboratory, City and Sherwood Hospitals, Hucknall Road, Nottingham, NG5 1PH

Tel.: Nottingham (STD 0602) 65065

E. R. Mitchell, M.B., M.R.C.Path., Dip.Bact. (*Director*)
P. A. Greaves, F.I.M.L.T. (*Head Technician*)
M. J. Lewis, M.D., Dip.Bact.

PETERBOROUGH:

Public Health Laboratory, Peterborough District Hospital, Peterborough, PE3 6DA

Tel.: Peterborough (STD 0733) 67451, Ext. 410

E. J. G. Glencross, M.B., M.R.C.Path., Dip.Bact. (*Director*)
M. W. D. Buxton, F.I.M.L.T. (*Head Technician*)

PLYMOUTH:

Public Health Laboratory, Plymouth General Hospital, Greenbank Road, Plymouth, PL4 8NN

Tel.: Plymouth (STD 0752) 63997

P. D. Meers, M.D., M.R.C.Path., Dip.Bact. (*Director*)
Miss Gillian M. Churcher, M.B., M.R.C.Path., Dip.Bact.
G. H. Sandys, F.I.M.L.T., (*Head Technician*)

POOLE:

Public Health Laboratory, Poole General Hospital, Poole, Dorset, BH15 2JB

Tel: Poole (STD 02013) 5771

*W.L. Hooper, B.Sc., M.B., M.R.C.Path., Dip.Bact. (*Acting Director*)
M. S. Jones, F.I.M.L.T. (*Head Technician*)

PORTSMOUTH:

Public Health Laboratory, St. Mary's General Hospital, East Wing, Milton Road, Portsmouth, PO3 6AQ

Tel.: Portsmouth (STD 0705) 22331

D. J. H. Payne, M.B., F.R.C.Path., Dip.Bact. (*Director*)
J. V. T. Gostling, M.A., M.B., F.R.C.Path., M.R.C.S. (*Deputy Director*)
Mrs. Rosalind Maskell, M.A., B.M., D.Obst.R.C.O.G. (*part-time*)
O. A. Okubadejo, M.D., D.C.P.
A. D. Pearson, B.A., B.M.
R. A. Quaife, F.I.M.L.T. (*Head Technician*)
Mrs. Susan T. Scarfe, B.Sc.
Miss Janet E. M. Strangeways, M.B., M.R.C.S.

PRESTON:

Public Health Laboratory, Royal Infirmary, Meadow Street, Preston, PR1 6PS

Tel.: Preston (STD 0772) 53975

L. Robertson, M.A., B.M., F.R.C.Path., Dip.Bact. (*Director*)
H. C. Dawkins, F.I.M.L.T. (*Head Technician*)
I. D. Farrell, B.Sc., Ph.D.
†D. N. Hutchinson, M.D., Dip.Bact. (*Deputy Director*)

READING:

Public Health Laboratory, Royal Berkshire Hospital, Reading, RG1 5AN

Tel.: Reading (STD 0734) 52957

J. V. Dadswell, M.B., M.R.C.Path. (*Director*)
R. A. Everard, F.I.M.L.T. (*Head Technician*)

SALISBURY:

Public Health Laboratory, Odstock Hospital, Salisbury

Tel.: Salisbury (STD 0722) 6020

P. J. Wormald, M.D., F.R.C.Path. (*Director*)
A. S. Greasby, F.I.M.L.T. (*Head Technician*)

SHREWSBURY:

Public Health Laboratory, Royal Salop Infirmary Group Laboratories, Mytton Oak Road, Shrewsbury, SY3 8XH

Tel.: Shrewsbury (STD 0743) 57101

A. C. Jones, M.B., M.R.C.Path. (*Director*).
P. H. Everall, F.I.M.L.T. (*Technical Officer*)
C. A. Morris, B.Sc., M.D., Dip. Bact.

*Consultant Microbiologist employed by the Wessex Regional Hospital Board (*see* p. 42).
†Consultant Microbiologist employed by the Manchester Regional Hospital Board (*see* p. 42).

SOUTHAMPTON:

Public Health Laboratory, General Hospital, Tremona Road, Southampton, SO9 4XY

Tel.: Southampton (STD 0703) 76177

J. M. Graham, M.B., M.R.C.Path., Dip.Bact. (*Director*)
A. M. R. Mackenzie, M.A., B.M., B.Sc., M.R.C.Path., Dip.Bact.
W. G. Suckling, A.I.M.L.T. (*Head Technician*)

SOUTHEND:

Public Health Laboratory, Southend General Hospital, Prittlewell Chase, Westcliff-on-Sea, SS0 0RY

Tel.: Southend (STD 0702) 48911

J. A. Rycroft, M.B., M.R.C.Path., Dip.Bact. (*Director*)
A. F. Barnard, F.I.M.L.T. (*Head Technician*)

STAFFORD:

Public Health Laboratory, Martin Street, Stafford

Tel.: Stafford (STD 0785) 54377

P. Cavanagh, M.A., M.D., B.A.O., Dip.Bact. (*Director*)
L. J. Haughton, F.I.M.L.T. (*Head Technician*)

SUNDERLAND:

Public Health Laboratory, Havelock Hospital, Hylton Road, Sunderland, SR4 8AE

Tel.: Sunderland (STD 0783) 56256

P. B. Crone, M.D., Dip.Bact. (*Director*)
J. B. Patton, F.I.M.L.T. (*Head Technician*)

SWANSEA:

Public Health Laboratory, Cockett Road, Swansea, SA2 0FA

Tel.: Swansea (STD 0792) 24041

W. Kwantes, M.A., M.B., F.R.C.Path., Dip.Bact. (*Director*)
R. Brooks, F.I.M.L.T. (*Head Technician*)
Mrs. Barbara R. Ivey, M.B. (*part-time*)

TAUNTON:

Public Health Laboratory, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton

Tel.: Taunton (STD 0823) 85557/8

J. V. S. Pether, M.A., B.M., M.R.C.Path., D.T.M. & H., Dip.Bact. (*Director*)
Mrs. Patricia M. Benn, M.B. (*part-time*)
F. B. Greatorex, F.I.M.L.T. (*Head Technician*)
Miss Phillippa H. Trevains, B.Sc.

TEESSIDE

Public Health Laboratory, General Hospital, Ayresome Green Lane, Middlesbrough, Teesside, TS5 5AZ

Tel.: Middlesbrough (STD 0642) 87766

P. R. Mortimer, M.B., M.R.C.Path. (*Director*)
A. M. A. Abbas, M.B., Ph.D., M.P.H.
W. H. Bound, F.I.M.L.T. (*Head Technician*)

TRURO:

Public Health Laboratory, Royal Cornwall Hospital (City), Infirmary Hill, Truro

Tel.: Truro (STD 0872) 3029

G. I. Barrow, M.D., M.R.C.Path. Dip.Bact. (*Director*)
C. Ellis, F.I.M.L.T. (*Head Technician*)
J. C. K. Mills, M.A., M.B., Dip.Bact.

WAKEFIELD:

Public Health Laboratory, Wood Street, Wakefield, WF1 2HL

Tel.: Wakefield (STD 0924) 76961

L. A. Little, M.B., F.R.C.Path. Dip.Bact. (*Director*)
G. Denton, F.I.M.L.T. (*Head Technician*)
H. Fennell, B.Sc.

WATFORD:

Public Health Laboratory, Shrodells Wing, Watford General Hospital, Vicarage Road, Watford, WD1 8HB

Tel.: Watford (STD 92) 44366

B. R. Eaton, M.B., M.R.C.Path., D.C.H. (*Director*)
Miss Hilda Taylor, F.I.M.L.T. (*Head Technician*)

WINCHESTER:

Public Health Laboratory, Royal Hampshire County Hospital, Winchester

Tel.: Winchester (STD 0962) 3807

M. H. Hughes, M.A., D.M., F.R.C.Path., D.T.M. & H., Dip.Bact. (*Director*)
D. I. Bartlett, F.I.M.L.T (*Head Technician*)

WOLVERHAMPTON:

Public Health Laboratory, New Cross Hospital, Wolverhampton WV10 0QP

Tel.: Wolverhampton (STD 0902) 734311

*I. A. Harper, M.B., M.R.C.Path. (*Honorary Director*)
J. Leek, F.I.M.L.T. (*Head Technician*)
R. G. Thompson, M.R.C.S.

WORCESTER:

Public Health Laboratory, Royal Infirmary, Castle Street Branch, Worcester, WR1 3AS

Tel.: Worcester (STD 0905) 25238/9

R. J. Henderson, M.D. (*Director*)
H. R. Jenkins, F.I.M.L.T. (*Head Technician*)
M. B. Skirrow, M.B., Ph.D., M.R.C.Path., D.T.M.&H.

*Consultant Microbiologist employed by the Birmingham Regional Hospital Board (*see* p. 42).

These Laboratories normally receive specimens only from other laboratories within or without the Service.

CROSS-INFECTION REFERENCE LABORATORY:

(*incorporating the Staphylococcus and Streptococcus Reference Laboratories*):

Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT

Tel.: 01-205 7041

M. T. Parker, M.D., F.R.C.Path., Dip.Bact. (*Director*)
Mrs. Elizabeth A. Hall Asheshov, Ph.D., M.R.C.Path., Dip.Bact.
*Miss Jane E. Ballard, M.Sc.
Mrs. Brenda M. Brock, B.Sc.
†D. F. J. Brown, B.Sc.
A. W. Coe (*Head Technician*)
M. A. Curtis, B.Sc.
*N. Foord, B.Sc.
*O. M. Lidwell, D.Phil. (*Deputy Director*)
W. R. Maxted, Hon. Dr. (Leiden), M.I.Biol., F.I.M.L.T.
L. S. Nakhla, M.B., Ph.D., D.L.O.
Mrs. Alison M. Pinney, B.Pharm.
Mrs. Jennifer M. Thirlwell, B.Sc.
Mrs. Adeline G. Towers, B.Sc., M.B., M.R.C.Path. (*part-time*)
Mrs. Jean P. Widdowson, B.Pharm., Ph.D., M.P.S.

ENTERIC REFERENCE LABORATORY:

Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT

Tel.: 01-205 7041

E. S. Anderson, M.D., F.R.C.Path., Dip.Bact., F.R.S. (*Director*)
Mrs. Jacqueline Carr, B.Sc.
Miss Marian M. Darling, B.Sc.
J. D. H. de Sa, M.Sc., Ph.D.
F. J. Flynn (*Head Technician*)
Miss Anne H. Gilmour, B.Sc.
Mrs. June N. Grindley, B.Sc.
N. D. F. Grindley, B.A.
C. S. Heymann, M.B., M.R.C.Path., D.P.H., D.T.M.& H., Dip.Bact.
G. O. Humphreys, B.Sc., Ph.D.
H. R. Smith, B.A.
E. J. Threlfall, B.Sc., Ph.D.
Mrs. Linda R. Ward, B.Sc.
Miss Jennifer A. Weaver, M.Sc.

DISINFECTION REFERENCE LABORATORY:

Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT

Tel.: 01-205 7041

J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact. (*Director*)
Mrs. Isobel M. Maurer, B.Sc.

LEPTOSPIROSIS REFERENCE LABORATORY:

London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT

Tel.: 01-636 8636

L. H. Turner, M.B.E., M.D., D.T.M. & H. (*Director*)
G. McGimpsey, F.I.M.L.T. (*Head Technician*)

---

* Members of the external scientific staff of the Medical Research Council.
† At Clinical Research Centre, Northwick Park Hospital

MYCOLOGICAL REFERENCE LABORATORY:

London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT
Tel.: 01-636 8636

D. W. R. MacKenzie, B.Sc., Ph.D. (*Director-designate*)
Miss Christine M. Philpot, B.Sc. (*Acting Director*)
M. R. Hollingdale, B.Sc., Ph.D.
A. G. J. Proctor, T.D., B.D., F.I.M.L.T.

MYCOPLASMA REFERENCE LABORATORY:

Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT
Tel.: 01-205 7041

B. E. Andrews, M.R.C.S., F.R.C.Path., Dip.Bact. (*Director*)
R. A. Hewish, F.I.M.L.T. (*Head Technician*)
R. H. Leach, M.Sc., D.Phil. (*Deputy Director*)

SALMONELLA AND SHIGELLA REFERENCE LABORATORY:

Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT
Tel.: 01-205 7041

B. Rowe, M.A., M.B., D.T.M.&H., (*Director*)
Mrs. Heather A. Allen, B.Sc.
Miss Christine R. Cattran, B.A.
Miss Kathryn A. Forshaw, B.Sc., Ph.D.
R. J. Gross, M.A., M.I.Biol.
Mrs. Mary L. M. Hall, B.Sc.
D. P. Woodroof, F.I.M.L.T. (*Head Technician*)

TUBERCULOSIS REFERENCE LABORATORY:

University Hospital of Wales, Heath Park, Cardiff, CF4 4XW
Tel.: (Cardiff STD 0222) 755944 *Ext.* 2049

J. Marks, M.D., F.R.C.P., F.R.C.Path., Dip.Bact. (*Director*)
P. A. Jenkins, Ph.D.
J. L. Leat, B.Sc.
P. J. Patterson (*Head Technician*)
Miss Judith M. Stanton, B.Sc.

VENEREAL DISEASE REFERENCE LABORATORY:

London Hospital Research Laboratories, Ashfield Street, London, E1 2BL
Tel.: 01-790 3008

A. E. Wilkinson, M.B., F.R.C.Path., M.R.C.S. (*Director, part-time*)
Miss Nafra A. Johnston, M.D., D.R.C.O.G. (*part-time*)
G. Scrimgeour, M.B., M.R.C.Path., Dip.Bact.
A. D. Seth, M.Sc.
C. J. Storey (*Head Technician*)
Miss Christina C. Wiseman, B.Sc.

VIRUS REFERENCE LABORATORY:

Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT
Tel.: 01-205 7041

Mrs. Marguerite S. Pereira, M.D. (*Director*)
Mrs. Hazel Appleton, B.Sc.
Mrs. Pratima Chakraverty, B.Sc., M.Phil.
Miss Yvonne E. Cossart (Mrs. Wills), M.B., B.Sc., M.R.C.Path., D.C.P.
J. Craske, M.B., M.R.C.Path., Dip.Bact.
Miss Anne M. Field, B.Sc., Ph.D.
Miss Sylvia D. Gardner, M.B., M.R.C.Path., Dip.Bact.
Mrs. Patricia E. Gibson, M.Sc.
P. G. Higgins, M.D., M.R.C.Path., Dip.Bact.
Miss Wendy A. Knowles, B.Sc.
J. R. McDonald, F.I.M.L.T. (*Senior Technical Officer*)
Mrs. E. Valerie Meurisse, M.Sc.
F. G. Rodgers, B.Sc.
Mrs. Mary O. Roebuck, M.B., Dip.Bact. (*part-time*)
Mrs. Elise M. Vandervelde, M.B., Dip.Bact.

Note: With the exception of smallpox and related virus diseases, rabies and the serology of typhus fever, the Virus Reference Laboratory does not receive specimens for routine diagnosis. Such specimens are received at all regional and most area laboratories and enquiries should be directed to the nearest P.H.L.S. laboratory.

COMPUTER TRIALS DEPARTMENT:

Central Public Health Laboratory,
Colindale Avenue, London,
NW9 5HT
Tel.: 01-205 7041

S. P. Lapage, M.B., F.R.C.Path., Dip.Bact. (*Director*)
B. Holmes, M.Sc.
R. Johnson, B.Sc.
W. R. Willcox, B.Sc.

EPIDEMIOLOGICAL RESEARCH LABORATORY:

Central Public Health Laboratory,
Colindale Avenue, London,
NW9 5HT
Tel.: 01-205 7041

T. M. Pollock, M.B., M.R.C.P.(Glasg.) (*Director*)
W. B. Fletcher, A.M.R., F.S.S.
J. A. Lee, M.B., D.P.H.
Miss Christine L. Miller (Mrs. Manning), B.M. (*part-time*)
N. D. Noah, M.B., M.R.C.P.
Mrs. Sheila Polakoff, M.D. D.P.H.
J. W. G. Smith, M.D., M.R.C.Path., Dip.Bact. (*Deputy Director*)
Miss Mair E. M. Thomas (Mrs. Livingstone), M.B., B.Sc., F.R.C.Path., D.P.H. (*part-time*)
Mrs. Hilary E. Tillett, M.Sc.
Mrs. Enid D. Vernon, B.Sc.

EPIDEMIOLOGICAL RESEARCH UNIT:

86 Dyer Street, Cirencester, Glos.,
GL7 2PF
Tel.: Cirencester (STD 0285) 3745 and 3330

R. E. Hope-Simpson, O.B.E., F.R.C.G.P., M.R.C.S. (*Director, part-time*)

FOOD HYGIENE LABORATORY:

Central Public Health Laboratory,
Colindale Avenue, London,
NW9 5HT
Tel.: 01-205 7041

Miss Betty C. Hobbs, O.St.J., D.Sc., F.R.C.Path., Dip.Bact. (*Director*)
A. C. Ghosh, B.Sc., B.V.Sc. & A.H., M.Phil.
R. J. Gilbert, M.Pharm., Ph.D., Dip.Bact., M.P.S.
Miss Margaret Kendall, F.I.M.L.T. (*Head Technician*)
Miss Diane Roberts, B.Sc.
Miss Antonnette A. Wieneke, Drs. (Holland)

NATIONAL COLLECTION OF TYPE CULTURES:

Central Public Health Laboratory,
Colindale Avenue, London,
NW9 5HT
Tel.: 01-205 7041

S. P. Lapage, M.B., F.R.C.Path., Dip.Bact. (*Curator*)
P. J. Fisher (*Head Technician*)
L. R. Hill, M.Sc., M.I.Biol. (*Deputy Curator*)
R. J. Owen, B.Sc.
K. D. Phillips, B.Sc.
K. F. Redway, B.Sc.

STANDARDS LABORATORY FOR SEROLOGICAL REAGENTS:

Central Public Health Laboratory,
Colindale Avenue, London,
NW9 5HT
Tel.: 01-205 7041

Mrs. C. M. Patricia Bradstreet, M.B., F.R.C.Path., Dip.Bact. (*Director*)
Miss E. Margaret Bailey, B.Sc.
Mrs. Diana J. Dicker, B.Sc.
Mrs. Mabel W. Dighero, B.Sc.
Mrs. Joan M. B. Edwards, M.B., M.R.C.Path. (*Deputy Director, part-time*)
J. Foreman, F.I.M.L.T. (*Head Technician*)
Miss Margaret Hind, B.Sc.
Miss Agnes J. Tannahill, B.Sc.

JUNIOR BACTERIOLOGISTS IN TRAINING

(*Attending course at the London School of Hygiene and Tropical Medicine for Diploma in Bacteriology*)

1971-72

A. D. Pearson, B.A., B.M.

(*Attending course at the University of Manchester for Diploma in Bacteriology*)

1971-72

C. Roberts, B.Sc., M.D.

STAFF ON SECONDMENT

Miss Audrey J. E. Flower, M.B., D.C.H. (*to St. Bartholomew's Hospital, London*)

P. P. Mortimer, B.A., M.B. (*to St. Stephen's Hospital, Chelsea, London*)

T. N. Stanbridge, M.B., M.R.C.S., Dip. Bact. (*to University of Manchester*)

HOSPITAL PATHOLOGICAL LABORATORIES DESIGNATED "RECOGNISED"

at which arrangements are made for the examination of public health specimens for the Service

AYLESBURY
Stoke Mandeville Hospital, Aylesbury, Buckinghamshire.

BOLTON
Royal Infirmary, Bolton, Lancashire.

WIGAN
Royal Infirmary, Wigan, Lancashire.

Consultant Microbiologists employed by Regional Hospital Boards in the Hospital Service, who are associated on a part-time or honorary basis with the Public Health Laboratory Service

J. F. ARCHER, M.D., M.R.C.Path., Dip. Bact.
Bury General Hospital, Walmersley Road, Bury, Lancashire.
Tel.: 061-764 2444.

F. A. J. BRIDGWATER, M.B., M.R.C.Path., Dip. Bact. (*See* p. 20.)
East Birmingham Hospital, Bordesley Green East, Birmingham, B9 5ST.
Tel.: 021-772 4311.

T. D. BROGAN, B.Sc., M.D., Ph.D.
Department of Medical Microbiology, The Welsh National School of Medicine, Heath Park, Cardiff, CF4 4XN.
Tel.: Cardiff (STD 0222) 755944.

T. H. FLEWETT, M.D., F.R.C.Path.
Regional Virus Laboratory, East Birmingham Hospital, Bordesley Green East, Birmingham, B9 5ST.
Tel.: 021-772 4021.

G. L. GIBSON, M.D., M.R.C.Path.
Group Pathology Laboratories, County Hospital, York, YO3 7PG.
Tel.: York (STD 0904) 25314.

I. A. HARPER, M.B., M.R.C.Path. (*See* p. 37.)
Wolverhampton Group of Hospitals, and Honorary Director, Public Health Laboratory, New Cross Hospital, Wolverhampton.
Tel.: Wolverhampton (STD 0902) 734311.

W. L. HOOPER, B.Sc., M.B., M.R.C.Path., Dip. Bact. (*See* p. 35.)
Bournemouth & East Dorset Group of Hospitals, Public Health Laboratory, Poole General Hospital, Poole, Dorset, BH15 2JB.
Tel.: Poole (STD 02013) 5771.

D. N. HUTCHINSON, M.D., Dip. Bact. (*See* p. 35.)
Group Laboratory, Royal Infirmary, Meadow Street, Preston.
Tel.: Preston (STD 0772) 57886.

Miss M. PATRICIA JEVONS, M.D., M.R.C.Path., Dip.Bact.
Group Pathology Laboratories, St. Stephen's Hospital, Chelsea, London, S.W.10.
Tel.: 01-352 8161.

H. S. LAWY, M.D., F.R.C.Path., L.M.S.S.A., Dp. Bact.
Department of Pathology, Grimsby General Hospital, Grimsby, Lincolnshire.
Tel.: Grimsby (STD 0472) 59051.

M. LONGSON, B.Sc., M.D.
Department of Virology, Withington Hospital, Manchester, M20 8LR
Tel.: 061-445 8111

D. A. McSWIGGAN, L.R.C.P.I., M.R.C.Path., D.T.M. & H., Dip. Bact. (*See* p. 33.)
Department of Microbiology, Central Middlesex Hospital, Park Royal, London, N10 7TN.
Tel.: 01-965 5733.

T. D. M. MARTIN, F.R.C.Path. M.R.C.S.,
Department of Pathology, Royal Berkshire Hospital, Reading, Berkshire.
Tel.: Reading (STD 0734) 83444.

J. M. MOORE, M.D., M.R.C.Path.
Bacteriology Laboratory, Doncaster Royal Infirmary, Doncaster, Yorkshire.
Tel.: Doncaster (STD 0302) 2286.

N. W. PRESTON, M.D., F.R.C.Path., Dp. Bact.
Department of Bacteriology and Virology, University of Manchester, Williamson Building, Brunswick Street, Manchester, M13 9PL.
Tel.: 061-273 3333.

D. S. REEVES, M.B., M.R.C.S., M.R.C.Path.
Department of Microbiology, Southmead Hospital, Westbury-on-Trym, Bristol, BS10 5NB.
Tel.: Bristol (STD 0272) 62-2821.

J. B. SELKON, M.B., M.R.C.Path., D.C.P. (*See* p. 29)
Department of Microbiology, Institute of Pathology, General Hospital, Westgate Road, Newcastle upon Tyne, NE4 6BE. *Tel.:* Newcastle (STD 0632) 3881.

J. M. STARK, M.D., M.R.C.Path., D.Path.
Department of Medical Microbiology, The Welsh National School of Medicine, Heath Park, Cardiff, CF4 4XN.
Tel.: Cardiff (STD 0222) 755944.

M. SUSSMAN, B Sc., Ph.D., M.I.Biol.
Department of Medical Microbiology, The Welsh National School of Medicine, Heath Park, Cardiff, CF4 4XN.
Tel.: Cardiff (STD 0222) 755944

J. M. TALBOT, M.D., M.R.C.Path., Dip.Bact.
Department of Pathology, Kingston Hospital, 37 Coombe Road, Kingston upon Thames, Surrey.
Tel.: 01-546 7711.

W. R. G. THOMAS, M.B., M.R.C.S., M.R.C.Path., D.T.M. & H., Dip.Bact.
Bacteriology Laboratory, Mayday Hospital, Mayday Road, Thornton Heath, Surrey CR4 7YE.
Tel.: 01-684 6999.

D. C. TURK, D.M., M.R.C.P., M.R.C.Path.
Department of Bacteriology, Radcliffe Infirmary, Oxford. *Tel.:* Oxford (STD 0865) 49891.

Mrs. BETTY E. WALLACE, M.A., M.D., F.R.C.Path., B.A.O.
Department of Clinical Microbiology, Royal Sussex County Hospital, Brighton, BN2 5BE.
Tel.: Brighton (STD 0273) 66611.

R. FRASER WILLIAMS, M.B., M.R.C.Path.
Department of Pathology, Monsall Hospital, Newton Heath, Manchester, M10 8WR.
Tel.: 061-205 2254.

In the following list the name of the expert who is responsible for the relevant examination is given. Reference experts normally receive specimens only from other laboratories within and without the Service. It should be added, however, that all regional and most area laboratories are undertaking the routine diagnosis of virus infections, the serological diagnosis of leptospiral infections, and the bacteriophage-typing of strains of *Staphylococcus aureus*. For this reason enquiries on these subjects should usually be addressed to the local public health laboratory.

Amoebiasis, diagnosis of

A. L. Jeanes, M.D., F.R.C.Path., Department of Medical Microbiology, Guy's Hospital, London, S.E.1. *Tel.:* 01-407 7600, *Ext.* 578.

Anaerobes, identification

A. T. Willis, M.D., D.Sc., Ph.D., M.R.A.C.P., M.R.C.Path., M.C.P.A., Public Health Laboratory, Luton and Dunstable Hospital, Lewsey Road, Luton, LU4 0DZ. *Tel.:* Luton (STD 0582) 52007.

Anthrax bacilli, identification

Miss Joan R. Davies, M.D., Dip.Bact. Public Health Laboratory, St. Luke's Hospital, Guildford. *Tel.:* Guildford (STD 0483) 66091

Anthrax, examination under Wool and Hair Regulations

T. F. Elias-Jones, M.B., F.R.C.Path., The City Laboratory, 23 Montrose Street, Glasgow, G1 1RN. *Tel.:* 041-221 9600 and 4348, *Ext.* 2400.

H. G. M. Smith, M.B., Ph.D., Dip.Bact., Public Health Laboratory, 16–18 Edmund Street, Bradford, BD5 0BH. *Tel.:* Bradford (STD 0274) 24314.

Miss Joan R. Davies, M.D., Dip. Bact. Public Health Laboratory, St. Luke's Hospital, Guildford. *Tel.:* Guildford (STD 0483) 66091.

G. C. Turner, M.D., F.R.C.Path., Public Health Laboratory, Fazakerley Hospital, Lower Lane, Liverpool, L9 7AL. *Tel.:* 051-525 2323.

Arboviruses

J. S. Porterfield, M.D., M.R.C.S., L.R.C.P., National Institute for Medical Research, Mill Hill, London, NW7 1AA. *Tel.:* 01-959 3666.

Arizona group, identification

B. Rowe, M.A., M.B., D.T.M.&H., Salmonella and Shigella Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.
Tel.: 01-205 7041.

Blood and intestinal protazoa

Professor W. H. R. Lumsden, D.Sc., M.B., M.R.C.P.E., D.T.M., D.T.H., F.R.S.E., Department of Medical Protozoology, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT. *Tel.:* 01-636 8636.

Brucella, identification

D. J. H. Payne, M.B., F.R.C.Path., Dip.Bact., Public Health Laboratory, St. Mary's General Hospital, East Wing, Milton Road, Portsmouth, PO3 6AQ. *Tel.:* Portsmouth (STD 0705) 22331.

Cholera and related virbios, Aeromonas, and Plesiomonas

A. L. Furniss, M.D., Dip.Bact., Public Health Laboratory, Preston Hall, Maidstone, Kent. *Tel.:* Maidstone (STD 0622) 77155.

Additional Reference Expert for *Vibrio Cholerae*

P. Cavanagh, M.A., M.D., B.A.O., Dip.Bact., Public Health Laboratory, Martin Street, Stafford. *Tel.:* Stafford (STD 0785) 54377.

Clostridium welchii, serological typing

Miss Betty C. Hobbs, O.St.J., D.Sc., F.R.C.Path., Dip.Bact., Food Hygiene Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Coxsackie A viruses

D. R. Gamble, M.B., M.R.C.Path., Dip.Bact., Public Health Laboratory, West Park Hospital, Epsom. *Tel.:* Epsom 01-39 26633.

Cytomegaloviruses

H. Stern, M.B., Ph.D., M.R.C.Path., Virus Department, St. George's Hospital Medical School, Hyde Park Corner, London, S.W.1.
Tel.: 01-235 4343, *Ext.* 147.

Regional Centres for Cytomegaloviruses Complement Fixation Tests

Bristol: Suzanne K. R. Clarke, M.D., M.R.C.Path., Public Health Laboratory, Myrtle Road, Kingsdown, Bristol, BS2 8EL. *Tel.:* Bristol (STD 0272) 21326.

Leeds: M. H. Hambling, M.D., M.R.C.Path., D.(Obst.)R.C.O.G., Dip.Bact., Public Health Laboratory, Bridle Path, York Road, Leeds, LS15 7TR.
Tel.: Leeds (STD 0532) 645011.

Manchester: J. O'H. Tobin, B.M., F.R.C.Path., M.R.C.P., Dp. Bact., Public Health Laboratory, Withington Hospital, Manchester, M20 8LR.
Tel.: 061-445 2416.

Virus Reference Laboratory: Miss Sylvia D. Gardner, M.B., M.R.C.Path., Dip.Bact., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Diphtheria bacilli, identification of

Professor M. G. McEntegart, M.D., F.R.C.Path., Department of Medical Microbiology, The University of Sheffield, Sheffield, S10 2TN.
Tel.: Sheffield (STD 0743) 78555.

J. M. S. Dixon, M.D., F.R.C.P.(C), F.R.C.Path., Dip.Bact., Provincial Laboratory of Public Health, University of Alberta, Edmonton 7, Alberta, Canada.

Disinfection

J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact., Disinfection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Drug Resistance in Enterobacteria

E. S. Anderson, M.D., F.R.C.Path., Dip.Bact., F.R.S., Enteric Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Enteric Fever

(*a*) Serological investigation of suspected cases and carriers.
(*b*) Phage-type and ecological study of strains of typhoid and paratyphoid bacilli, and of *Salmonella typhimurium* and certain other salmonella serotypes.

E. S. Anderson, M.D., F.R.C.Path., Dip.Bact., F.R.S., Enteric Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Entomological specimens, investigation

B. R. Laurence, Ph.D., Department of Entomology, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT. *Tel.:* 01-636 8636.

Escherichia coli, typing

B. Rowe, M.A., M.B., D.T.M.&H., Salmonella and Shigella Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Farmer's lung, serological diagnosis

Mycological Reference Laboratory, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT. *Tel.:* 01-636 8636.

D. G. Davies, M.D., F.R.C.Path., Dip.Bact., Public Health Laboratory, Cumberland Infirmary, Carlisle. *Tel.:* Carlisle (STD 0228) 23654

J. E. Jameson, M.R.C.S. Public Health Laboratory, Royal Sussex County Hospital, Brighton, BN2 5BE. *Tel.:* Brighton (STD 0273) 63506.

B. Moore, M.D., B.Sc., F.R.C.Path., Public Health Laboratory, Church Lane, Heavitree, Exeter, EX2 5AD. *Tel.:* Exeter (STD 0392) 77833.

H. D. S. Morgan, M.R.C.S., F.R.C.Path., Dip.Bact., Public Health Laboratory West Wales General Hospital, Glangwili, Carmarthen. *Tel.:* Carmarthen (STD 0267) 7271.

M. Sussman, B.Sc., Ph.D., M.I.Biol., Department of Medical Microbiology, The Welsh National School of Medicine, Heath Park, Cardiff, CF4 4XN. *Tel.:* Cardiff (STD 0222) 755944.

D. M. Weir, M.D., Immunology Laboratory, Department of Bacteriology, Edinburgh University Medical School, Teviot Place, Edinburgh. *Tel.:* 031-667 1011, *Ext.* 2256

*Food Poisoning**

Miss Betty C. Hobbs, O.St.J., D.Sc., F.R.C.Path., Dip.Bact., Food Hygiene Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Fungi (*pathogenic*), identification

Mycological Reference Laboratory, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT. *Tel.:* 01-636 8636.

Helminthological specimens, investigation

Professor G. S. Nelson, M.D., D.Sc., M.R.C.P., D.T.M.&H., D.A.P.&E., London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT. *Tel.:* 01-636 8636.

Hydatid disease, complement-fixation test for

Mrs. C. M. Patricia Bradstreet, M.B., F.R.C.Path., Dip.Bact., Standards Laboratory for Serological Reagents, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Immunofluorescence

C. E. D. Taylor, M.A., M.D., F.R.C.Path., Dip.Bact., Central Middlesex Hospital, Park Royal, London, NW10 7NT. *Tel.:* 01-965 5733.

Influenza

L. Hoyle, M.B., Public Health Laboratory, General Hospital, Northampton, NN1 5BD. *Tel.:* Northampton (STD 0604) 34347.

Mrs. Marguerite S. Pereira, M.D., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

---

* Owing to the perishable nature of most foodstuffs, material for investigation from outbreaks of food poisoning should normally be sent to the nearest public health laboratory. The reference laboratory should be used mainly for non-perishable articles of food, especially when litigation may arise, and for the identification of strains.

Listeria typing

Miss Agnes J. Tannahill, B.Sc., Standards Laboratory for Serological Reagents, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Malaria parasites and other blood protozoa

Professor P. C. C. Garnham, C.M.G., M.D., D.Sc., F.R.C.P., F.R.S., Malaria Reference Laboratory, Horton Hospital, Epsom, Surrey. *Tel.:* 01-39 22343, *Ext.* 9.

Meningococci, typing

Mrs. C. M. Patricia Bradstreet, M.B., F.R.C.Path., Dip.Bact., Standards Laboratory for Serological Reagents, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Parasitic infections, serological diagnosis of

D. S. Ridley, B.Sc., M.D., F.R.C.Path., Department of Pathology, Hospital for Tropical Diseases, 4 St. Pancras Way, London, N.W.1. *Tel.:* 01-387 4411.

Plague, investigation

R. J. Henderson, M.D., Public Health Laboratory, Royal Infirmary, Castle Street Branch, Worcester, WR1 3AS. *Tel.:* Worcester (STD 0905) 25238/9.

Pneumococci, typing of, from epidemics

M. T. Parker, M.D., F.R.C.Path., Dip.Bact., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Poliomyelitis, marker tests

Miss Yvonne E. Cossart, M.B., B.Sc., M.R.C.Path., D.C.P., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Protective cabinets

O. M. Lidwell, D.Phil., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Psittacosis, isolation of causative agent

Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Rabies, laboratory tests for diagnosis

Miss Sylvia D. Gardner, M.B., M.R.C.Path., Dip. Bact., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Rickettsia

A. D. Evans, M.B., B.Sc., M.R.C.Path., Dip.Bact., Public Health Laboratory, University Hospital of Wales, Heath Park, Cardiff, CF4 4XW. *Tel.:* Cardiff (STD 0222) 755944.

Salmonella, typing

B. Rowe, M.A., M.B., D.T.M.&H., Salmonella and Shigella Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Shigella sonnei, confirmation and typing

Miss Joan R. Davies, M.D., Dip.Bact., Public Health Laboratory, St. Luke's Hospital, Guildford, Surrey. *Tel.:* Guildford (STD 0483) 66091.

Shigella (all sub-groups other than *Shigella sonnei*) and related organisms

B. Rowe, M.A., M.B., D.T.M.&H., Salmonella and Shigella Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Smallpox, laboratory tests for diagnosis

Birmingham: H. S. Bedson, M.D., M.R.C.P.,
Professor P. Wildy, M.B., M.R.C.S., F.R.S.E.,
Department of Virology, The University, Birmingham, B15 2TJ.
Tel.: 021-472 1301. *Night extension:* 021-472 3524.

Bristol: Miss Suzanne K. R. Clarke, M.D., M.R.C.Path., Public Health Laboratory, Myrtle Road, Kingsdown, Bristol, BS2 8EL.
Tel.: Bristol (STD 0272) 21326.

Cardiff: A. D. Evans, M.B., B.Sc., M.R.C.Path., Dip. Bact., Public Health Laboratory, University Hospital of Wales, Heath Park, Cardiff, CF4 4XW.
Tel.: Cardiff (STD 0222) 755944.

Leeds: M. H. Hambling, M.D., M.R.C.Path., D.(Obst.)R.C.O.G., Dip. Bact., Public Health Laboratory, Bridle Path, York Road, Leeds, LS15 7TR.
Tel.: Leeds (STD 0532) 645011.

Liverpool: Professor K. McCarthy, M.D., F.R.C.Path., Department of Medical Microbiology, New Medical School, University of Liverpool, P.O. Box 147, Liverpool, L69 3BX. *Tel.:* 051-709 6022 *Ext.* 202: after 6 p.m. 051-709 7983/6022.

London: Mrs. Marguerite S. Pereira, M.D., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT.
Tel.: 01-205 7041.

Newcastle: J. H. Hale, O.B.E., M.D., F.R.C.Path., M.R.C.P., Public Health Laboratory, Institute of Pathology, General Hospital, Westgate Road, Newcastle upon Tyne, NE4 6BE.
Tel.: Newcastle (STD 0632) 38811, *Ext.* 297.

Staphylococcal enterotoxin, typing

R. J. Gilbert, M.Pharm., Ph.D., Dip.Bact., M.P.S., Food Hygiene Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Staphylococci, bacteriophage-typing

M. T. Parker, M.D., F.R.C.Path., Dip.Bact., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Streptococci of Group A, typing

M. T. Parker, M.D., F.R.C.Path., Dip.Bact., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

Regional Typing Laboratories

(i) *Northern and South-Eastern Counties:* Cumberland, Co. Durham, Lancs., Northumberland, Westmorland, Yorks., Dorset, Hants., Kent, London, Surrey, Sussex.

M. T. Parker, M.D., F.R.C.Path., Dip.Bact., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

(ii) *Eastern Counties:* Beds., Cambs., Derby, Essex, Herts., Hunts., Leics., Lincs., Norfolk, Northants., Notts., Rutland, Suffolk.

Miss Joan M. Boissard, M.R.C.S., Public Health Laboratory, Tennis Court Road, Cambridge, CB2 1QR. *Tel.:* Cambridge (STD 0223) 55526 and 57573.

(iii) *Western Counties:* Berks., Bucks., Cheshire, Cornwall, Devon, Glos., Hereford, Oxon., Salop, Somerset, Staffs., Warw., Wilts., Worcs.

Public Health Laboratory, Radcliffe Infirmary, Oxford, OX2 6AH.
Tel.: Oxford (STD 0865) 49231/2.

(iv) *Wales.*

Professor Scott Thomson, M.D., F.R.C.P.E., F.R.C.Path., D.P.H., Department of Microbiology, University Hospital, Heath Park, Cardiff, CF4 4XW.
Tel.: Cardiff (STD 0222) 755944.

Toxoplasmosis

North

G. B. Ludlam, M.D., F.R.C.Path., D.T.M.&H., D.L.O., Public Health Laboratory, Bridle Path, York Road, Leeds, LS15 7TR.
Tel.: Leeds (STD 0532) 645011.

South (excluding London)

W. Kwantes, M.A., M.B., F.R.C.Path., Dip.Bact., Public Health Laboratory, Cockett Road, Swansea, SA2 0FA. *Tel.:* Swansea (STD 0792) 24041.

London

D. G. Fleck, M.D., M.R.C.Path., Dip.Bact., Public Health Laboratory, St. George's Hospital, Tooting Grove, London, S.W.17.
Tel.: 01-672 1255.

Trichinosis, examination of rats and pigs

Professor G. S. Nelson, M.D., D.Sc., M.R.C.P., D.T.M.&H., D.A.P.&E., London School of Hygiene & Tropical Medicine, Keppel Street, London, WC1E 7HT. *Tel.:* 01-636 8636.

Tubercle bacilli and other mycobacteria

J. Marks, M.D., F.R.C.P., F.R.C.Path., Dip.Bact., Tuberculosis Reference Laboratory, University Hospital of Wales, Heath Park, Cardiff, CF4 4XW. *Tel.:* Cardiff (STD 0222) 755944, *Ext.* 2049.

Regional Centres for Tuberculosis Bacteriology

Birmingham: F. A. J. Bridgwater, M.B., M.R.C.Path., Dip. Bact., Public Health Laboratory, East Birmingham Hospital, Bordesley Green East, Birmingham, B9 5ST.
Tel.: 021-772 4311.

Bristol: H. R. Cayton, M.B., F.R.C.Path., Public Health Laboratory, Myrtle Road, Kingsdown Bristol, BS2 8EL. *Tel.:* Bristol (STD 0272) 21326.

Liverpool: G. C. Turner, M.D., F.R.C.Path., Public Health Laboratory, Fazakerley Hospital, Lower Lane, Liverpool, L9 7AL.
Tel.: 051-525 2323.

London: C. H. Collins, M.I.Biol., F.I.M.L.T., Bacteriological Laboratory (P.H.L.S.), Room 617, County Hall, Westminster Bridge, London, S.E.1.
Tel.: 01-928 3467.

Manchester: J. D. Abbott, M.D., M.R.C.Path., Dip.Bact., Public Health Laboratory, Withington Hospital, Manchester, M20 8LR.
Tel.: 061-445 2416.

Newcastle: J. B. Selkon, M.B., M.R.C.Path., D.C.P., Public Health Laboratory, Institute of Pathology, General Hospital, Westgate Road, Newcastle upon Tyne, NE4 6BE. *Tel.:* Newcastle (STD 0632) 38811, *Ext.* 297.

Wakefield: L. A. Little, M.B., F.R.C.Path., Dip.Bact., Public Health Laboratory, Wood Street, Wakefield, WF1 2HL. *Tel.:* Wakefield (STD 0924) 76961.

Typhus fever, serological tests*

Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, NW9 5HT. *Tel.:* 01-205 7041.

---

* The Weil-Felix test can be carried out in all constituent laboratories of the Service, and also in a number of hospital laboratories. Only sera giving a doubtful reaction should be sent to the Virus Reference Laboratory.

Venereal diseases, Treponemal immobilisation test

A. E. Wilkinson, M.B., F.R.C.Path., M.R.C.S., Venereal Diseases Reference Laboratory, London Hospital Research Laboratories, Ashfield Street, London, E1 2BL. *Tel.:* 01-790 3008.

Midlands

P. J. L. Sequiera, M.B., The Central Serology Laboratory, Withington Hospital, West Didsbury, Manchester, M20 8LR.
Tel.: Manchester (STD 061-445) 7683.

North

J. H. Hale, O.B.E., M.D., F.R.C.Path., M.R.C.P., Public Health Laboratory, Institute of Pathology, General Hospital, Westgate Road, Newcastle upon Tyne, NE4 6BE. *Tel.:* Newcastle (STD 0632) 38811, *Ext.* 297.

Vibrio parahaemolyticus

G. I. Barrow, M.D., M.R.C.Path., Dip. Bact., Public Health Laboratory, Royal Cornwall Hospital (City), Infirmary Hill, Truro. *Tel.:* Truro (STD 0872) 3029.

Yersinia pseudotuberculosis and *Yersinia enterocolitica*

N. S. Mair, M.B., F.R.C.Path., D.C.H., D.P.H., Dip.Bact., Public Health Laboratory, Groby Road Hospital, Leicester, LE3 9GE.
Tel.: Leicester (STD 0533) 872283.

VACCINES AND OTHER IMMUNOLOGICAL MATERIALS OBTAINABLE THROUGH THE PUBLIC HEALTH LABORATORY SERVICE

For the address of P.H.L.S. laboratories *see* pp. 26–35

**Rabies Vaccine and Antiserum*

Stocks are held by the P.H.L.S. laboratories at:

Liverpool
London (Colindale)
Newcastle
Cardiff

Anthrax Vaccine

Stocks are held by the P.H.L.S. laboratories at:

Bradford
Liverpool
London (Colindale)

Human immunoglobulin

Immunoglobulin prepared from the pooled plasma of normal healthy adults is obtainable on request from regional or area laboratories. In the past this product has been used for the protection of women in contact with rubella during the first three months of pregnancy, often without estimations of serum antibody levels to see if they are at risk or not. In the light of recent trials it is recommended that all such women should be bled and their immune status determined and, in areas where this answer is available within a few days, for immunoglobulin to be reserved for those found to be susceptible. It is important to advise, however, that the use of immunoglobulin will not prevent infection although it may have a marginal effect on the incidence of abnormalities in the baby if a clinical infection is turned into a non-clinical one. If serological studies show that a susceptible woman could have been infected by rubella virus during the early part of pregnancy, the question of termination should be discussed with her general practitioner, whose duty it is to give her advice.

Immunoglobulin is also used for the prevention of infectious hepatitis in circumstances of special risk. It may likewise be used for contacts of measles where it is important to prevent infection. A separate preparation labelled " Human Normal Immunoglobulin (for use with Measles Vaccine) " is also available. This is issued in bulk to local health authorities to meet individual requests from doctors. This special preparation is intended for use only in children whose state of health is such as to make it necessary to ensure the absence of any marked febrile reaction to measles vaccine. It is not obtainable directly from Public Health Laboratories but from Local Health Authorities.

**Anti-vaccinial human immunoglobulin*

In addition to normal human immunoglobulin, a stock of immunoglobulin prepared from the blood of persons recently vaccinated against smallpox is held for the treatment of cases of generalised vaccinia, eczema, vaccinatum, accidental vaccinial infections endangering the eye, and, in special circumstances, for the

---

* Urgent requests for rabies vaccine or antiserum and anti-vaccinial human immunoglobulin only are received at any time at the Central Public Health Laboratory, Colindale.

protection of unvaccinated smallpox contacts. This anti-vaccinial human immunoglobulin may be obtained from the P.H.L.S. laboratories at:

Birmingham
Bristol
Cambridge
Cardiff
Gloucester
Leeds
Leicester
Liverpool
London (Colindale)
Manchester
Newcastle
Oxford
Sheffield

Material for intradermal diagnostic tests

Frei antigen for Lymphogranuloma inguinale, Brucellin for Undulant fever, Trichina antigen for Trichinosis, Hydatid antigen for Hydatid disease, and cat-scratch fever antigen can be obtained from the P.H.L.S. Standards Laboratory, which also issues, to any pathologist, Kveim antigen for sarcoidosis. Enquiries relating to fungal antigens should be addressed to the P.H.L.S. Mycology Reference Laboratory.

Notes on other immunological materials obtainable from special centres:

1. *Antisera for therapeutic use*

Obtainable through the Hospital Pathological Service (see appendix to HM (71)64) from which the list below is abstracted:

(a) anthrax antiserum
(b) botulinum antitoxin
(c) human antitetanus immunoglobulin
(d) ovine antitetanus serum

Note: L = Pathology Laboratory
P = Pharmacy

Region 1

L	Carlisle, Cumberland Infirmary	abcd
P	Newcastle, General Hospital	abcd
	Catterick, O.C. Military Hospital	c

Region 2

P	Hull, Castle Hill Hospital	abcd
P	Leeds, Seacroft Hospital	abcd

Region 3

P	Nottingham, City Hospital	abcd

Region 4

	Cambridge, Director, Regional Transfusion Centre	abcd

Region 5

P	London, N.7, Royal Northern Hospital	a
P	Edgware, General Hospital	bcd

Region 6

L	London, N.18, North Middlesex Hospital	abcd
	Colchester, O.C. Military Hospital	c

Region 7

	Southborough, Director, S.E. Depot, Blood Transfusion Centre	abcd

Region 8

	Tooting, Director, South London Transfusion Centre, Tooting Grove	abcd
	Aldershot, O.C. Cambridge Military Hospital	c

Region 9

L	Northampton, General Hospital	abcd
P	Reading, Royal Berks. Hospital	abcd
P	Oxford, Churchill Hospital (day only)	c
P	Oxford, Radcliffe Infirmary (day only)	d

Region 10

P	Bristol, Ham Green Hospital	abcd
P	Exeter, Royal Devon and Exeter Hospital	abcd
	Plymouth, O. i/c Accident Department, General Hospital, Freedom Fields	abcd
P	Truro, Royal Cornwall Hospital, Treliske Branch	abcd

Region 11

P	Cardiff, Royal Infirmary	abcd
P	Bangor, Caernarvon and Anglesey General Hospital	abcd
P	Wrexham, Maelor General Hospital	abcd
P	Swansea, Singleton Hospital, Sketty	ab
P	Carmarthen, West Wales General Hospital	bcd
P	Aberystwyth, Bronglais District General Hospital	bcd

Region 12

P	Shrewsbury, Royal Salop Infirmary	acd
P	Birmingham 29, Selly Oak Hospital	abcd
P	Stoke-on-Trent, North Staffs Royal Infirmary	acd

Region 13

P	Manchester, Royal Infirmary	abcd

Region 14

P	Liverpool 9, Fazakerley Hospital	abcd

Region 15

P	Southampton, Royal South Hants. Hospital	abcd
P	Salisbury, Odstock Hospital	a
	Salisbury, Officer-in-Charge, Accident Department, General Hospital	cd
L	Dorchester, Director, Public Health Laboratory	cd
P	Portsmouth, Royal Portsmouth Hospital	cd

2. *Yellow fever inoculation*
A list of centres can be obtained from the Department of Health and Social Security, Alexander Fleming House, Elephant and Castle, London, S.E.1.

3. *TABC, cholera, typhus and other vaccines*
Most of these are available commercially.

4. *Smallpox Vaccine*
Obtainable from Public Health Departments of Local Authorities (Counties, County Boroughs and London Boroughs).

APPENDIX I

COMMITTEES AND WORKING PARTIES

Communicable Disease Report Working Party

Chairman: T. M. Pollock, M.B., M.R.C.P. (Glasg.)
Secretary: Mrs. Enid D. Vernon, B.Sc.

H. R. Cayton, M.B., F.R.C.Path.
Miss Lynette M. Dowsett, M.D., F.R.C.Path.
W. B. Fletcher, A.M.R., F.S.S.
M. H. Hughes, M.A., D.M., F.R.C.Path., D.T.M.&H., Dip.Bact.
J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact.
S. P. Lapage, M.B., F.R.C.Path., Dip.Bact.
E. R. Mitchell, M.B., M.R.C.Path., Dip.Bact.
B. Moore, M.D., B.Sc., F.R.C.Path.
Professor Scott Thomson, M.D., F.R.C.P.E., F.R.C.Path., D.P.H.
J. O'H. Tobin, B.M., M.R.C.Path., Dp.Bact.
R. H. Westlake
B. K. Kelly, M.A. (*Medical Research Council Computer Services Centre*)

Working Party on Epidemic Non-Bacterial Gastro-Enteritis

Chairman: B. Moore, M.D., B.Sc., F.R.C.Path.

Secretary: Miss Suzanne K. R. Clarke, M.D., M.R.C.Path.

M. H. Hughes, M.A., D.M., F.R.C.Path., D.T.M.&H., Dip.Bact.
J. E. Jameson, M.R.C.S.
E. R. Mitchell, M.B., M.R.C.Path., Dip.Bact.
T. D. F. Money, M.A., M.B., D.(Obst.)R.C.O.G.
J. O'H. Tobin, B.M., M.R.C.Path., Dp.Bact.
J. E. M. Whitehead, M.B., F.R.C.Path., Dip.Bact.
J. Barnes, M.B., M.Sc., D.P.H. (*Department of Health and Social Security*)

Joint Public Health Laboratory Service/Animal Health Division Standing Advisory Committee

P.H.L.S. Members

E. S. Anderson, M.D., F.R.C.Path., Dip.Bact., F.R.S.
J. H. McCoy, M.B., D.P.H.
D. J. H. Payne, M.B., F.R.C.Path., Dip.Bact.

Veterinary Members

A. C. L. Brown, M.R.C.V.S.
M. L. Burdin, O.B.E., B.Sc., M.R.C.V.S.
A. J. Stevens, M.A., B.V.Sc., M.R.C.V.S., Dip.Bact.

Working Party on Farmer's Lung

Chairman and Secretary: H. D. S. Morgan, F.R.C.Path., M.R.C.S., Dip.Bact.

D. G. Davies, M.D., F.R.C.Path., Dip. Bact.
J. E. Jameson, M.R.C.S.
B. Moore, M.D., B.Sc., F.R.C.Path.
C. A. Morris, B.Sc., M.D., Dip.Bact.
Miss Christine M. Philpot, B.Sc.
M. Sussman, B.Sc., Ph.D., M.I.Biol. (*Department of Medical Microbiology, The Welsh National School of Medicine*)
D. M. Weir, M.D. (*Department of Bacteriology, Edinburgh University Medical School*)

Advisory Sub-Committee on Application and Report Forms

Chairman: R. Pilsworth, M.D., Dip.Bact.
Secretary: G. H. Tee, F.R.C.Path., M.R.C.S., Ph.D.

Advisory Sub-Committee on Laboratory Supplies

Chairman: Miss Joan R. Davies, M.D., Dip.Bact.
Secretary: A. Waltho

Library Advisory Committee

Joint Chairmen:
B Moore, M.D., B.Sc., F.R.C.Path.
Miss Betty H. Whyte, M.A., A.L.A.
Secretary: Miss Betty H. Whyte, M.A., A.L.A.

Standing Committee on Office Equipment and Methods

Chairman: J. H. Hale, O.B.E., M.D., F.R.C.Path., M.R.C.P.
Secretary: A. Waltho

Standing Committee on Technicians

Chairman: R. J. Henderson, M.D.
Secretary: J. W. Bushell

Working Parties on Acute Respiratory Virus Infections

(Working in collaboration with the Medical Research Council Working Party)

Group I: Acute Respiratory Virus Infections in General Practice

Chairman: P. G. Higgins, M.D., M.R.C.Path., Dip.Bact.

Joint Secretaries:

R. E. Hope-Simpson, O.B.E., F.R.C.G.P., M.R.C.S.
D. L. Miller, M.D., D.P.H.

Group III: Acute Respiratory Virus Infections among Children in Hospital

Chairman, Laboratory Group: J. O'H. Tobin, B.M., F.R.C.Path., M.R.C.P., Dp.Bact.
Chairman, Clinical Group: Professor S. D. M. Court, M.D., F.R.C.P., D.C.H. (*University of Newcastle*)

Secretary: Miss Pauline M. Poole, M.D., M.R.C.Path., B.A.O., Dip.Bact.

Advisory Committee on Viral Reagents

Chairman: Mrs. C. M. Patricia Bradstreet, M.B., F.R.C.Path., Dip.Bact.

Secretary: Miss E. Margaret Bailey, B.Sc.

Miss Suzanne K. R. Clarke, M.D., M.R.C.Path.
J. V. T. Gostling, M.A., M.B., F.R.C.Path., M.R.C.S.
P. G. Higgins, M.D., M.R.C.Path., Dip.Bact.
Mrs. Marguerite S. Pereira, M.D.
J. O'H. Tobin, B.M., F.R.C.Path., M.R.C.P., Dp.Bact.
G. B. B. White, M.R.C.S., M.R.C.Path., Dip.Bact.

Committee on Infection Risks of Haemodialysis

Chairman and Secretary: B. Moore, M.D., B.Sc., F.R.C.Path.

Miss Yvonne E. Cossart, M.B., B.Sc., M.R.C.Path., D.C.P.
E. H. Gillespie, M.B., F.R.C.Path.
D. M. Jones, M.D., M.R.C.Path., Dip. Bact.
J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact.
Mrs. Sheila Polakoff, M.D., D.P.H.
G. C. Turner, M.D., F.R.C.Path.
J. R. Ascott, M.B., M.R.C.S., D.O.M.S. (*Department of Health and Social Security*)
J. C. Coleman, M.B., M.R.C.S. (*Fulham Hospital*)
R. G. Mitchell, M.R.C.P., M.R.C.Path. (*Churchill Hospital, Oxford*)

Committee and Working Party on Whooping Cough

Chairman: E. H. Gillespie, M.B., F.R.C.Path.

Secretary: J. D. Abbott, M.D., M.R.C.Path., Dip.Bact.

Miss Asne H. Antonis, M.B.
H. R. Cayton, M.B., F.R.C.Path.
Miss Lynette M. Dowsett, M.D., F.R.C.Path.
J. V. T. Gostling, M.A., M.B., F.R.C.Path., M.R.C.S.
J. H. Hale, O.B.E., M.D., F.R.C.Path., M.R.C.P.
R. J. Henderson, M.D.
P. G. Higgins, M.D., M.R.C.Path., Dip.Bact.
H. H. Johnston, M.A., D.Phil.
L. A. Little, M.B., F.R.C.Path., Dip.Bact.
N. S. Mair, M.B., F.R.C.Path., D.C.H., D.P.H., Dip.Bact.
E. R. Mitchell, M.B., M.R.C.Path., Dip.Bact.
B. Moore, M.D., B.Sc., F.R.C.Path.
D. J. H. Payne, M.B., F.R.C.Path., Dip.Bact.
Mrs. Sheila Polakoff, M.D., D.P.H.
T. M. Pollock, M.B., M.R.C.P.(Glasg.)
Miss Pauline M. Poole, M.D., M.R.C.Path., B.A.O., Dip.Bact.
H. G. M. Smith, M.B., Ph.D., Dip.Bact.
Miss Mair E. M. Thomas, M.B., B.Sc., F.R.C.Path., D.P.H.
Professor Scott Thomson, M.D., F.R.C.P.E., F.R.C.Path., D.P.H.
G. C. Turner, M.D., F.R.C.Path.
J. E. M. Whitehead, M.A., M.B., F.R.C.Path., Dip.Bact.
P. J. Wormald, M.D., F.R.C.Path.
A. E. Wright, T.D., M.D., M.R.C.Path., D.P.H., Dip.Bact.
Professor R. Cruickshank, C.B.E., M.D., F.R.C.P., D.P.H. (17 *Greenhill Gardens, Edinburgh*, 10)
Professor J. P. Duguid, B.Sc., M.D., F.R.C.Path. (*Bacteriology Department, University of St. Andrews*)
W. N. Dunnet, M.D., D.P.H. (*Department of Health and Social Security*)
T. F. Elias-Jones, M.B., F.R.C.Path. (*City Laboratory, Glasgow*)
R. R. Gillies, M.D., M.R.C.Path., D.P.H. (*Bacteriology Department, University of Edinburgh*)
F. T. Perkins, M.Sc., Ph.D. (*Immunological Products Control, Medical Research Council*)
N. W. Preston, M.D., M.R.C.Path., Dip.Bact. (*Department of Bacteriology and Virology, University of Manchester*)
A. F. B. Standfast, M.A., D.Sc., Dip.Bact. (*Vaccine Department, Lister Institute of Preventive Medicine*)
I. Taylor, M.D., F.R.C.P., D.P.H. (22 *Wales Avenue, Carshalton, Surrey*)
J. F. Warin, O.B.E., M.D., M.R.C.P., D.P.H. (*Medical Officer of Health, City of Oxford*)
A. M. M. Wilson, B.A., B.M., F.R.C.Path. Dip.Bact. (*Bacteriology Department, University of Edinburgh*)

Working Party on Microbiological Specifications for Food

Chairman: Miss Betty C. Hobbs, O.St.J., D.Sc., F.R.C.Path., Dip.Bact.

G. I. Barrow, M.D., M.R.C.Path., Dip.Bact.
H. R. Cayton, M.B., F.R.C.Path.
R. D. Gray, M.D., F.R.C.Path., D.P.H.
R. W. S. Harvey, B.Sc., M.D., F.R.C.Path., Dip.Bact.
R. J. Henderson, M.D.
W. L. Hooper, B.Sc., M.B., M.R.C.Path., Dip.Bact.
H. H. Johnston, M.A., D.Phil.
W. F. Lane, M.B., M.Sc., F.R.C.Path., D.P.H.
J. H. McCoy, M.B., D.P.H.
P. G. Mann, M.D., M.R.C.Path., Dip.Bact.
B. Moore, M.D., B.Sc., F.R.C.Path.
L. Robertson, M.A., B.M., F.R.C.Path., Dip.Bact.
A. J. Kingsley Smith, B.M., M.R.C.Path.
H. G. M. Smith, M.B., Ph.D., Dip.Bact.
Miss Mair E. M. Thomas, M.B., B.Sc., F.R.C.Path., D.P.H.
A. T. Willis, M.D., D.Sc., Ph.D., M.R.C.Path., M.R.A.C.P.
A. E. Wright, T.D., M.D., M.R.C.Path., Dip.Bact.

Standing Committee on Degree Level Diploma in Medical Technology

Chairman: J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact.

C. H. Collins, F.I.M.L.T.
R. A. Quaife, F.I.M.L.T.
G. C. Turner, M.D., F.R.C.Path.
P. J. Wormald, M.D., F.R.C.Path.

Working Party on Streptococcal Infection in Residential Schools

Chairman: G. B. Ludlam, M.D., F.R.C.Path., D.T.M.&H., D.L.O.

Secretary: D. C. J. Bassett, M.B., Dip.Bact.

Miss Joan M. Boissard, M.R.C.S.
H. R. Cayton, M.B., F.R.C.Path.
J. V. Dadswell, M.B., M.R.C.Path.
C. Dulake, M.B., M.R.C.Path., Dip.Bact.
W. B. Fletcher, A.M.R., F.S.S.
P. K. Fraser, M.D., F.R.C.Path., M.R.C.P.
M. H. Hughes, M.A., D.M., F.R.C.Path., D.T.M.&H., Dip.Bact.
J. G. P. Hutchison, M.D., F.R.C.P. (Glasg.), M.R.C.Path.
L. A. Little, M.B., F.R.C.Path., Dip. Bact.
P. G. Mann, M.D., M.R.C.Path., Dip.Bact.
D. L. Miller, M.D., D.P.H.
G. R. E. Naylor, M.D., M.R.C.P., M.R.C.Path.
M. T. Parker, M.D., F.R.C.Path., Dip.Bact.
Miss Pauline M. Poole, M.D., M.R.C.Path., B.A.O., Dip.Bact.
B. T. Thom, M.B., M.R.C.Path., Dip.Bact.
P. J. Wormald, M.D., F.R.C.Path.
J. C. Gould, M.D., F.R.S.E., F.R.C.P. (Edin.), M.R.C.Path. (*Central Microbiological Laboratory, Edinburgh*)
R. C. Tyldesley, M.B. (*Kingswood Approved School, Bristol*)

Working Party on the Hygiene and Marketing of Fresh Cream

Chairman: R. J. Henderson, M.D.

Secretary: A. E. Wright, T.D., M.D., M.R.C.Path., D.P.H., Dip.Bact.

G. I. Barrow, M.D., M.R.C.Path., Dip.Bact.
G. T. Cook, M.D., F.R.C.Path.
J. M. Croll, M.B., F.R.C.Path., D.P.H.
J. V. Dadswell, M.B., M.R.C.Path.
D. G. Davies, M.D., F.R.C.Path., Dip.Bact.
H. C. Dawkins, F.I.M.L.T.
E. H. Gillespie, M.B., F.R.C.Path.
Miss Betty C. Hobbs, O.St.J., D.Sc., F.R.C.Path., Dip.Bact.
J. G. P. Hutchison, M.D., F.R.C.P. (Glasg.), M.R.C.Path.
Miss Ruth C. J. James, M.B., M.R.C.Path., Dip.Bact.
P. G. Mann, M.D., M.R.C.Path., Dip.Bact.
A. J. Kingsley Smith, B.M., M.R.C.Path.
G. H. Tee, M.R.C.S., Ph.D., F.R.C.Path.
Miss Joan M. Watkinson, B.Sc.
P. J. Wormald, M.D., F.R.C.Path.
W. Shepherd, M.D., M.R.C.Path. (*Bacteriology Laboratory, Belfast City Hospital*)

Standing Committee on Quality Control

Chairman: R. Blowers, M.D., F.R.C.Path., M.R.C.P., Dip.Bact.

Secretary: J. D. Abbott, M.D., M.R.C.Path., Dip.Bact.

P. B. Crone, M.D., Dip.Bact.
W. B. Fletcher, A.M.R., F.S.S.
R. D. Gray, M.D., F.R.C.Path., D.P.H.
R. J. C. Hart, M.B., M.R.C.S., M.R.C.Path., Dip.Bact.
M. H. Hughes, M.A., D.M., F.R.C.Path., D.T.M.&H., Dip.Bact.
S. P. Lapage, M.B., F.R.C.Path., Dip.Bact.
J. H. McCoy, M.B., D.P.H.
C. E. D. Taylor, M.A., M.D., M.R.C.Path., Dip.Bact.
J. D. Whittaker, M.B.E.
C. L. Greenbury, M.D., F.R.C.Path., M.R.C.S. (*Stoke Mandeville Hospital, Aylesbury*)
A. C. Scott, M.D. (*Department of Bacteriology, University of Dundee*)

Working Party on Hepatitis

Chairman: Miss Yvonne E. Cossart, M.B., B.Sc., M.R.C.Path., D.C.P.

Secretary: Mrs. Sheila Polakoff, M.D., D.P.H.

A. D. Evans, M.B., B.Sc., M.R.C.Path., Dip.Bact.
J. V. T. Gostling, M.A., M.B., F.R.C.Path., M.R.C.S.
J. H. Hale, O.B.E., M.D., F.R.C.Path., M.R.C.P.
G. C. Turner, M.D., F.R.C.Path.
T. H. Flewett, M.D., F.R.C.Path. (*Regional Virus Laboratory, Birmingham*)
F. O. MacCallum, M.D., F.R.C.Path. (*Virology Department, Radcliffe Infirmary, Oxford*)

Working Party on Safety Requirements for the Installation and Operation of Centrifuges

Chairman: M. T. Parker, M.D., F.R.C.Path., Dip.Bact.

Miss Joan R. Davies, M.D., Dip.Bact.
J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact.
O. M. Lidwell, D.Phil.
A. Waltho

Standing Committee on Influenza

Chairman: P. G. Mann, M.D., M.R.C.Path., Dip.Bact.

R. J. C. Hart, M.B., M.R.C.S., M.R.C.Path., Dip.Bact.
C. H. L. Howells, B.Sc., M.D., F.R.C.Path.
Mrs. Hélène J. Mair, M.D., M.R.C.Path., Dip.Bact.
E. R. Mitchell, M.B., M.R.C.Path., Dip.Bact.
M. T. Parker, M.D., F.R.C.Path., Dip.Bact.
Mrs. Marguerite S. Pereira, M.D.
J. W. G. Smith, M.D., M.R.C.Path., Dip. Bact.
Professor D. L. Miller, M.D., D.P.H. (*Department of Social and Preventive Medicine, Middlesex Hospital, London*)
A. T. Roden, M.D., M.R.C.S., D.P.H. (*Department of Health and Social Security*)

Working Party on Brucellosis

Chairman: L. Robertson, M.A., B.M., M.R.C.Path., Dip.Bact.

Secretary: I. D. Farrell, B.Sc., Ph.D.

G. I. Barrow, M.D., M.R.C.Path., Dip.Bact.
R. J. Henderson, M.D.
C. H. L. Howells, B.Sc., M.D., F.R.C.Path.
D. J. H. Payne, M.B., F.R.C.Path., Dip.Bact.
J. G. Wallace, B.M., M.R.C.Path., D.C.P., Dip.Bact.

APPENDIX II

PUBLICATIONS BY MEMBERS OF THE STAFF OF THE PUBLIC HEALTH LABORATORY SERVICE DURING 1971

Besides the specific items mentioned below, there are many publications to which the work of the Service has contributed. The internationally recognised reference laboratories and the Epidemiological Research Laboratory submit figures regularly to W.H.O. for inclusion in their statistical periodicals. Again, the giving of specialist help and advice and the supply of serological reagents are among the functions of the Service, and in the course of the year a number of papers have acknowledged such contributory work by members of the staff. Other unlisted material includes leading articles, unsigned annotations, conference papers which remain unpublished, book reviews, contributions to the various abstracting journals, and notes compiled from the Service's weekly Communicable Disease Report which appear regularly in the Brit. med. J. *and elsewhere.*

Abbott, J. D., Preston, N. W. and Mackay, R. I. Agglutinin response to pertussis vaccination in the child. *Brit. med. J.*, 1971, **i**, 86.

Alexander, J. G., Boyce, J. M. H., Dulake, C., Percival, A. and Wormald, P. J. U.K. multicentric study [of sensitivities of urinary tract pathogens]: comments by other participants. *Postgrad. med. J.*, 1971, **47**, Sept. Suppl., p. 14.

Anderson, E. S. Observations on the ecological effects of antibacterial drugs. In: *Resistance to infectious disease: proceedings of an international symposium, Saskatoon*, 1969, edited by R. H. Dunlop and H. W. Moon. Saskatoon, Modern Press, 1970, p. 157.

Anderson, E. S. Proposed use of a non-motile variant of *Salmonella typhi* for the preparation of vaccine against typhoid fever. *Symp. Ser. immunobiol. Standard.*, 1971, **15**, 79.

Andrews, B. E., Thomas, M. E. M. and Fletcher, W. B. Mycoplasmas in the human genital tract. [Abstract.] *J. med. Microbiol.*, 1971, **4**, Pxx.

Babington, P. C. B., Baker, A. B. and Johnston, H. H. Retrograde spread of organisms from ventilator to patient via the expiratory limb. *Lancet*, 1971, **i**, 61.

Barclay, Grizel R., Leader-Williams, L. K. and Flewett, T. H. Aspects of influenza C virus replication. *J. Hyg., Camb.*, 1971, **69**, 587.

Barrow, G. I. and Hewitt, M. Skin infection with *Mycobacterium marinum* from a tropical fish tank. *Brit. med. J.*, 1971, **ii**, 505.

Bascomb, Shoshana, Lapage, S. P., Willcox, W. R. and Curtis, M. A. Numerical classification of the tribe *Klebsiella*. *J. gen. Microbiol.*, 1971, **66**, 279.

Bassett, D. C. J. Causes and prevention of sepsis due to Gram-negative bacteria: common-source outbreaks. *Proc. R. Soc. Med.*, 1971, **64**, 980.

Bassett, D. C. J. The effect of *p*H on the multiplication of a pseudomonad in chlorhexidine and cetrimide. *J. clin. Path.*, 1971, **24**, 708.

Bettelheim, K. A., Dulake, C. and Taylor, J. Postoperative urinary infections caused by *Escherichia coli*. *J. clin. Path.*, 1971, **24**, 442.

Bettelheim, K. A. and Taylor, J. Soluble antigens of enteropathogenic *Escherichia coli*. *Ann. N.Y. Acad. Sci.*, 1971, **176**, 301.

Birch-Andersen, A., Jephcott, A. E. and Reyn, A. Demonstration of fibrils in cultures of gonococci. [Abstract.] *J. med. Microbiol.*, 1971, **4**, Pxix.

Blainey, J. D., Earle, A., Flewett, T. H. and Williams, L. K. L. Is the urine infective in serum hepatitis? [Letter.] *Lancet*, 1971, **i**, 797.

BRADSTREET, C. M. Patricia and POLLOCK, T. M. Skin-test in diagnosis of brucellosis. [Letter.] *Lancet*, 1971, **i**, 647.

BUCKLEY, Helen R. Fungi pathogenic for man and animals. II. The subcutaneous and deep-seated mycoses. In: *Methods in Microbiology*, **4**, edited by C. Booth. London, Academic Press, 1971, p. 461.

BUCKLEY, Helen R., LAPA, E. W. and HIPP, S. S. Immunological significance of some antigens of *Candida albicans*. *V int. Congr. infect. Dis., Vienna, 1970*, 1970, **4**, 21.

BULLEN, Catherine L. and WILLIS, A. T. Resistance of the breast-fed infant to gastroenteritis. *Brit. med. J.*, 1971, **iii**, 338.

CAUL, E. O., CLARKE, S. K. R., MOTT, M. G., PERHAM, T. G. M. and WILSON, R. S. E. Cytomegalovirus infections after open heart surgery: a prospective study. *Lancet*, 1971, **i**, 777.

CHESSUM, B., FRENGLEY, J. D., FLECK, D. G. and MAIR, N. S. Case of septicaemia due to *Yersinia enterocolitica*. *Brit. med. J.*, 1971, **iii**, 466.

CLARKE, Suzanne K. R. and STEELE, P. R. "Glandular fever" on Everest. [Letter.] *Lancet*, 1971, **ii**, 657.

COLLINS, C. H. Abstracts in "Medical Laboratory Technology." *Gaz. Inst. med. Lab. Tech.*, 1971, **15**, 225.

COSSART, Yvonne E. El antigéno Australia. *Med. clín., Barcelona*, 1971, **57**, 257.

COSSART, Yvonne E. The Australia/SH antigen and hepatitis. In: *Current problems in clinical virology*, edited by J. E. Banatvala. Edinburgh, Churchill Livingstone, 1971, p. 97.

COSSART, Yvonne E. Australia antigen and hepatitis: a review. *J. clín. Path.*, 1971, **24**, 394.

COSSART, Yvonne E. Nuevos aspectos de la epidemiología de las hepatitis. *Med. clín., Barcelona*, 1971, **57**, 111.

COSSART, Yvonne E., FIELD, A. M., HARGREAVES, F. D. and PORTER, A. A. Morphology and immunological properties of Australia/SH antigen in hepatitis. *Microbios*, 1971, **3**, 5.

CRADOCK-WATSON, J. E., MCQUILLIN, J. and GARDNER, P. S. Rapid diagnosis of respiratory syncytial virus infection in children by the immunofluorescent technique. *J. clin. Path.*, 1971, **24**, 308.

DAVIES, J. A., STRANGEWAYS, J. E. M., MITCHELL, R. G., BEILIN, L. J., LEDINGHAM, J. G. G. and HOLT, J. M. Comparative double-blind trial of cephalexin and ampicillin in treatment of urinary infections. *Brit. med. J.*, 1971, **iii**, 215.

FIELD, Anne M. and COSSART, Y. E. Specificity of Au antibodies. [Letter.] *Lancet*, 1971, **ii**, 91.

FLECK, D. G. Congenital toxoplasmosis. *Proc. XIII int. Congr. Paediat., Vienna, 1971*, 1971, **1**, 181.

FLECK, D. G. Tests for toxoplasmosis. [Letter.] *Lancet*, 1971, **ii**, 1319.

FLEWETT, T. H. Twenty-five years of medical virology. *Brit. J. clin. Pract.*, 1971, **25**, 485.

FURNISS, A. L. Unusual case of viral pericarditis. [Letter.] *Lancet*, 1971, **i**, 753.

GAMBLE, D. R. Antibodies to Coxsackie B virus in diabetes mellitus. *Lab. Med.*, 1971, **2**, No. 1, 37.

GARDNER, Sylvia D., FIELD, A. M., COLEMAN, D. V. and HULME, B. New human papovavirus (B.K.) isolated from urine after renal transplantation. *Lancet*, 1971, **i**, 1253.

GARROD, L. P. and HOWIE, *Sir* James. Antibiotic sensitivity testing. [Letter.] *Brit. med. J.*, 1971, **iv**, 488.

GILBERT, R. J. Food poisoning. In: *Hygiene and food production*, edited by A. Fox. Edinburgh, Churchill Livingstone, 1971, p. 9.

GILBERT, R. J. and WATSON, H. M. Some laboratory experiments on various meat preparation surfaces with regard to surface contamination and cleaning. *J. Food Tech.*, 1971, **6**, 163.

GILLESPIE, E. H. Some problems of a cardiac department. *Brit. Hosp. J. soc. Serv. Rev.*, 1971, **81**, 1497.

GILLESPIE, E. H. What causes whooping-cough? [Letter.] *Lancet*, 1971, **i**, 85.

GLENCROSS, E. J. Ornithosis: a disease of birds transmitted to man. *Rur. Dist. Rev.*, 1971, **77**, 252.

GOODWIN, C. S., COWAN, M. C. and LAVIS, D. J. Antibiotics in mycoplasma media, and the temporary storage of specimens containing mycoplasmas of the genital tract. *J. clin. Path* 1971, **24**, 286.

GOODWIN, C. S., KLIGER, B. N. and DREWETT, S. E. Colistin-sensitive proteus organisms, including indole-negative *Proteus vulgaris*, non-swarming on first isolation. *Brit. J. exp. Path.*, 1971, **52**, 138.

GORDON, H. and FLECK, D. G. An epidemic of diphtheria carriers. *Publ. Hlth, Lond.*, 1971, **85**, 228.

GOSTLING, J. V. T. Long-incubation hepatitis and tattooing. [Letter.] *Lancet*, 1971, **ii**, 1033.

GRINDLEY, June N. and ANDERSON, E. S. I-like resistance factors with the *fi*$^+$ character. *Genet. Res.* 1971, **17**, 267.

GRINDLEY, N. D. F., ANDERSON, E. S., SMITH, H. R. and GRINDLEY, J. N. The effects of *Salmonella typhimurium* on derepressed mutants of F-like factors. *Genet. Res.* 1971, **17**, 89.

HALL, J. D. and WILLIS, A. T. An episode of typhoid fever in a Sikh community. *Publ. Hlth, Lond.*, 1971, **85**, 159.

HALL, Mary L. M. and TAYLOR, J. *S. dublin:* relation between living calf vaccine strain and those isolated from human and other sources. *Symp. Ser. immunobiol. Standard.*, 1971, **15**, 183.

HARPER, I. A. The importance of group B streptococci as human pathogens in the British Isles. *J. clin. Path.*, 1971, **24**, 438.

HART, J. C. D., MARMION, V. J., CLARKE, S. K. R. and BARNARD, D. L. Epidemic kerato-conjunctivitis. [Letter.] *Brit. med. J.*, 1971, **iv**, 229.

HARVEY, R. W. S. and PRICE, T. H. Spread of salmonellas. [Letter.] *Lancet*, 1971, **i**, 1133.

HENDERSON, R. J. Brucellin skin-testing. [Letter.] *Lancet*, 1971, **i**, 548.

HENDERSON, R. J. Report on the health laboratory services in Ceylon; . . . in Thailand; . . . in Nepal; . . . in Indonesia; . . . in India; . . . in Burma; . . . in South-East Asia.(WHO Project: SEARO 0159) SEA/HLM/42, 47–52, 1971. [Wld Hlth Org. restricted documents.]

HENDERSON, R. J. Report on the training of public health laboratory technicians in Turkey. EURO/Turkey 4201/71, 1971. [Wld Hlth Org. restricted document.]

HENDERSON, R. J. Summary of recent abstracts. VI. Plague. *Trop. Dis. Bull.*, 1971, **68**, 777.

HENDERSON, R. J., CUMMINGS, P. and TILLETT, H. E. Outbreak of influenza B virus in Worcester schools. *Community Med.*, 1971, **126**, 267.

HIGGINS, P. G. Virus infections of the skin and mucous membranes. In: *Current problems in clinical virology*, edited by J. E. Banatvala. Edinburgh, Churchill Livingstone, 1971, p. 74.

HOBBS, Betty C. Food poisoning from poultry. In: *Poultry disease and world economy*, edited by R. F. Gordon and B. M. Freeman. (Brit. Egg Marketing Bd Symp. 7) Edinburgh, Longmans, 1971, p. 65.

HOBBS, Betty C. and GILBERT, R. J. Botulism from canned soup. [Letter.] *Lancet*, 1971, **ii**, 1157.

HOBBS, Betty C. and OLSON, J. C. Symposium on the restoration of sub lethally impaired bacterial cells in foods. I. Introduction. *J. Milk Food Tech.*, 1971, **34**, 548.

HOBBS, G., WILLIAMS, K. and WILLIS, A. T. Basic methods for the isolation of clostridia. In: *Isolation of anaerobes* (*Soc. appl. Bact. tech. Ser.* No. 5), edited by D. A. Shapton and R. G. Board. London, Academic Press, 1971, p. 1.

HOOPER, W. L. Microbial contamination of pharmaceuticals. [Letter.] *Pharm. J.*, 1971, 207, 462.

HOPE-SIMPSON, R. E. Determism and free-will. [Letter.] *Lancet*, 1971, **ii**, 1421.

HOPE-SIMPSON, R. E. Hong Kong influenza variant. [Letter.] *Brit. med. J.*, 1971, **iii**, 531.

HOWELLS, C. H. L. and TYLER, L. E. A comparative trial of ampicillin, tetracycline, and a combination of trimethoprim and sulphamethoxazole in the treatment of respiratory infections. *Brit. J. clin. Pract.*, 1971, **25**, 77.

HOWIE, *Sir* James. Keeping research alive as well as respectable. *Scot. med. J.*, 1971, **16**, 500.

HOWIE, *Sir* James. Modern British medical laboratories: foreword. *Hosp. Mgmt, Sevenoaks*, 1971, **34**, Suppl., p. 77.

HOWIE, *Sir* James. The planning of health laboratory services in the context of a national health plan. WHO/HLS/71.47, 1971. [Wld Hlth Org. working document.]

HOWIE, *Sir* James. The Public Health Laboratory Service. In: *Calling the laboratory*, 3rd ed., edited by W. A. R. Thomson. Edinburgh, Churchill Livingstone, 1971, p. 135.

HOWIE, *Sir* James. Public Health Laboratory Service research. In: *Portfolio for health: the role and programme of the DHSS in health services research*, published for the Nuffield Provincial Hospitals Trust. London, Oxford University Press, 1971, p. 213.

HOYLE, L. and ALMEIDA, J. D. The chemical reactions of the haemagglutinins and neuraminidases of different strains of influenza viruses. III. Effects of proteolytic enzymes. *J. Hyg., Camb.*, 1971, **69**, 461.

HUGHES, M. H., BARTLETT, D. I., BAKER, M., DREAPER, R. E. and ROWE, B. Gastroenteritis due to *Salmonella* subgenus III (Arizona): a second case diagnosed in Britain. *J. Hyg., Camb.*, 1971, **69**, 507.

HUTCHINSON, D. N., COWBURN, G. R. and FAIRFAX, C. F. W. Rubella vaccination of non-immune schoolgirls and young women. *Community Med.*, 1971, **126**, 225.

INMAN, P. M. and CRONE, P. B. Familial outbreak of primary herpes infection. *Brit. J. Derm.*, 1971, **85**, 240.

JACOBS, J. W., PEACOCK, D. B., CORNER, B. D., CAUL, E. O. and CLARKE, S. K. R. Respiratory syncytial and other viruses associated with respiratory disease in infants. *Lancet*, 1971, **i**, 871.

JAMESON, Beryl, GAMBLE, D. R., LYNCH, J. and KAY, H. E. M. Five-year analysis of protective isolation. *Lancet*, 1971, **i**, 1034.

JEBB, W. H. H. The Public Health Laboratory Service. *J. Instn munic. Engrs*, 1971, **98**, 130.

JENKINS, P. A. and MARKS, J. Transient colonization of the respiratory tract by mycobacteria in South Wales. *Tubercle, Lond.*, 1971, **52**, 60.

JENKINS, P. A., MARKS J. and SCHAEFER, W. B. Lipid chromatography and seroagglutination in the classification of rapidly growing mycobacteria. *Amer. Rev. resp. Dis.*, 1971, **103**, 179.

JEPHCOTT, A. E. and REYN, A. *Neisseria gonorrhoeae:* colony variation I. *Acta path. microbiol. scand. B*, 1971, **79**, 609.

JEPHCOTT, A. E., REYN, A. and BIRCH-ANDERSEN, A. *Neisseria gonorrhoeae* III: demonstration of presumed appendages to cells from different colony types. *Acta path. microbiol. scand. B*, 1971, **79**, 437. (Also published as WHO/VDT/RES/GON/71.54, 1971 [Wld Hlth Org. working document].)

JOHNSTON, Nafra A. Laboratory practice in sexually transmitted diseases. *Tech. Venereol. Bull.*, 1971, **1**, 55.

JONES, Armorel M. *Escherichia coli* in retail samples of milk and their resistance to antibiotics. *Lancet*, 1971, **ii**, 347.

JUEL-JENSEN, B. E., MACCALLUM, F. O., MACKENZIE, A. M. R. and PIKE, M. C. Treatment of zoster with idoxuridine in dimethyl sulphoxide: results of two double-blind controlled trials. *Brit. med. J.*, 1970, **iv**, 776.

KELSEY, J. C. The control of the sterilization of disposable medical devices. *Proc. int. Conf. nosocomial Infect., Atlanta, 1970*. Chicago, American Hospital Association, 1971, p. 234.

KELSEY, J. C. The Public Health Laboratory Service. *Hosp. Mgmt, Sevenoaks*, 1971, **34**, Suppl., p. 84.

KELSEY, J. C. and MAURER, I. M. Asepsis and the general practitioner. *Hlth Trends*, 1971, **3**, 47.

KELSEY, J. C. and MAURER, I. M. Notes on sterilization and disinfection. *Mission Hosp. Bull.*, 1971, No. 38, 1.

KWANTES, W. and ISAAC, M. Listeriosis. [Letter.] *Brit. med. J.*, 1971, **iv**, 296.

LANG, D. J., SCHROEDER, S. A., KUNZ, L. J., THOMSON, L. A., HOBBS, B. C. and BUTLER, N. J. Salmonella-contaminated carmine dye: another example of in-plant contamination during processing. *Amer. J. publ. Hlth*, 1971, **61**, 1615.

LANGFORD, E. V. and LEACH, R. H. A new species of mycoplasma from cattle. [Abstract.] *Bact. Proc.*, 1971, p. 77.

LAPAGE, S. P. Culture collections of bacteria. *Biol. J. Linn. Soc.*, 1971, **3**, 197.

LAPAGE, S. P. Thoughts on screening tests in bacteriology. *J. clin. Path.*, 1971, **24**, 404.

LAUGHLIN, W. R. and MANN, P. G. The work and worth of an isolation unit within a district general hospital. *Contact, Bristol*, 1971, No. 6 [p. 8].

LAWS, G. J., INGHAM, H. R., CRONE, P. B. and SLATER, D. A. Contrasting growth on different peptones. *J. med. Microbiol.*, 1971, **4**, 289.

LEACH, P. Ann and WILLIS, A. T. Freeze-dried antibiotic sensitivity discs. *Med. Lab. Tech.*, 1971, **28**, 19.

LEAT, J. L. Transitional drug-resistance in tuberculosis. *Tubercle, Lond.*, 1971, **52**, 295.

LEAVENS, P. S. Automation of laboratory washing-up with the Miele G19. *Lab. Equipm. Dig.*, 1971, **9**, No. 3, 95.

LEAVENS, P. S. Mechanically assisted technique for pouring bacteriological culture plates. *Lab. Equipm. Dig.*, 1971, **9**, No. 6, 83.

LE MINOR, L. *avec la collaboration* de J. Taylor et R. Rohde. Supplément N° XIV au schéma de Kauffmann-White. *Ann. Inst. Pasteur*, 1971, **121**, 465.

LEONARD, J. C. and TOBIN, J. O'H. Polyneuritis associated with cytomegalovirus infections: a report from various centres. *Quart. J. Med.*, 1971, **40**, 435.

LEWIS, M. J. and STOCKER, B. A. D. A biochemical subdivision of one phage type of *Salmonella typhimurium*. *J. Hyg., Camb.*, 1971, **69**, 683.

LIDWELL, O. M. [Contribution to discussion.] In: *Clean air in hospitals: a conference arranged by the Royal College of Surgeons and the Institution of Mechanical Engineers, 1969*. London, Institution of Mechanical Engineers, 1970, p. 8.

LIDWELL, O. M. Hospital uses of unidirectional ("laminar") air flow. *Proc. int. Conf. nosocomial Infect., Atlanta, 1970*. Chicago, American Hospital Association, 1971, p. 207.

LIDWELL, O. M. Smoke trails and models for the exploration of uni-directional flow ventilation systems. *J. Instn Heat. Vent. Engrs*, 1971, **39**, 131.

LIDWELL, O. M., DAVIES, J., PAYNE, R. W., NEWMAN, P. and WILLIAMS, R. E. O. Nasal acquisition of *Staphylococcus aureus* in partly divided wards. *J. Hyg., Camb.*, 1971, **69**, 113.

LOWE, G. H. The gradient plate for the preliminary determination of concentration of inhibitory and nutrient agents. *Med. Lab. Tech.*, 1971, **28**, 64.

LUDLAM, G. B. Throat swabs. In: *Calling the laboratory*, 3rd ed., edited by W. A. R. Thomson. Edinburgh, Churchill Livingstone, 1971, p. 1.

MCALLISTER, T. A., PERCIVAL, A., ALEXANDER, J. G., BOYCE, J. M. H., DULAKE, C. and WORMALD, P. J. Multicentric study of sensitivities of urinary tract pathogens. *Postgrad. med. J.*, 1971, **47**, Sept. Suppl., p. 7.

MCCOY, J. H. Sewage pollution of natural waters. In: *Microbial aspects of pollution* (*Symp. Ser. Soc. appl. Bact.* No. 1), edited by G. Sykes and F. A. Skinner. London, Academic Press, 1971, p. 33.

MACDONALD, Helen, THOMPSON, K. M. and TOBIN, J. O'H. Vaccination of women with the Cendehill strain of rubella virus. *Practitioner*, 1971, **207**, 57.

MCROBERT, J. and HAMBLING, M. H. A small outbreak of Bornholm disease in a school. *Hlth Notes, Wakefield*, 1971, **4**, 15.

MARKS, J. Comparative skin tests in diagnosis. [Letter.] *Tubercle, Lond.*, 1970, **51**, 456.

MARKS, J. and JENKINS, P. A. The opportunist mycobacteria: a 20-year retrospect. *Postgrad. med. J.*, 1971, **47**, 705.

MARKS, J., JENKINS, P. A., KILPATRICK, G. S., ENGBAEK, H. C. and VERGMANN, B. Pulmonary tuberculosis due to B.C.G. *Brit. med. J.*, 1971, **iii**, 229.

MARKS, J., JENKINS, P. A. and SCHAEFER, W. B. Thin-layer chromatography of mycobacterial lipids as an aid to classification: technical improvements—*Mycobacterium avium*, *M. intracellulare* (Battey bacilli). *Tubercle, Lond.*, 1971, **52**, 219.

MARSHALL, N. J., HEWITT, J. H. and JAMES, A. M. Changes in the surface properties of three strains of *Staphylococcus aureus* on *in vitro* training to methicillin resistance. *Microbios*, 1971, **4**, 241.

MARTIN, Diana R. Variation in *Pseudomonas aeruginosa*. *University of London, Ph.D. Thesis*, 1971.

MELNICK, J. L., BOUCHER, D. W., CRASKE, J. and BOGGS, J. Properties of a virus isolated from patients with MS-1 infectious hepatitis. *J. infect. Dis.*, 1971, **124**, 76.

MILLER, D. L. and CLARKE, M. Studies on susceptibility to Hong Kong influenza 1968–70. [Abstract.] *Brit. J. prev. soc. Med.*, 1971, **25**, 55.

MILLER, D. L., PEREIRA, M. S. and CLARKE, M. Epidemiology of the Hong Kong/68 variant of influenza A2 in Britain. *Brit. med. J.*, 1971, **i**, 475.

MITCHELL, D. N., BRADSTREET, C. M. P. and SUTHERLAND, I. Validation and standardisation of Kveim test suspensions prepared from human sarcoid spleen. *V int. Conf. Sarcoidosis, Prague, 1969*, 1971, p. 375.

MITCHELL, D. N., REES, R. J. W. and BRADSTREET, C. M. P. Is the Kveim test safe? [Letter.] *Lancet*, 1971, **i**, 907.

MITCHELL, E. R. Sterilising cardiac equipment. *Brit. Hosp. J. soc. Serv. Rev.*, 1971, **81**, 1492.

MOORE, B. Epidemiologia de la contaminacion marina. *Trib. med., Madrid*, 1971, **8**, No. 376, 21.

MOORE, B. The handling of infectious material in the laboratory. *Ann. clin. Biochem.*, 1971, **8**, 136.

MOORE, B. The health hazards of pollution. In: *Microbial aspects of pollution* (*Symp. Ser. Soc. appl. Bact.* No. 1), edited by G. Sykes and F. A. Skinner. London, Academic Press, 1971, p. 11.

MOORE, B. Public health aspects. In: *Proceedings of symposium: water pollution control in coastal areas, Bournemouth, 1970*. London, Institute of Water Pollution Control, 1970, p. 22.

MOORE, B. Surveillance of hospital infection. *Proc. int. Conf. nosocomial Infect., Atlanta, 1970*. Chicago, American Hospital Association, 1971, p. 272.

MOORE, B. Typhoid: epidemiological investigation and control measures. *Publ. Hlth, Lond.*, 1971, **85**, 152.

MORRIS, C. A. Environmental factors influencing the microbiology of the female genital tract. *University of London, M.D. Thesis*, 1971.

MORRIS, C. A. Fatal pneumonia of infancy associated with group O streptococci. [Abstract.] *J. clin. Path.*, 1971, **24**, 764.

MURRAY, I. G. Progress in the serological diagnosis of mycetoma and other tropical fungus diseases. *Z. Tropenmed. Parasit.*, 1971, **22**, 326.

NAGINGTON, J. Cytomegalovirus antibody production in renal transplant patients. *J. Hyg., Camb.*, 1971, **69**, 645.

NAGINGTON, J. and CARNE, H. R. The morphology of corynebacterium phages. *J. gen. Virol.*, 1971, **13**, 167.

OKUBADEJO, O. A., MONTEFIORE, D. G. and HAMILTON, G. Multiple drug resistance in salmonella group G serotype associated with a high incidence of human infections. *J. trop. Med. Hyg.*, 1971, **74**, 167.

ORTON, W. T., WHITE, A. B. and PATTON, J. L. Possible transmission of typhoid fever by an asymptomatic infant. *Publ. Hlth, Lond.*, 1971, **85**, 167.

PAINE, T. F. and NAGINGTON, J. Inhibition of human embryonic cell cultured growth by sodium salicylate. *Nature new Biol.*, 1971, **233**, 108.

PARKER, M. T. Causes and prevention of sepsis due to Gram-negative bacteria: ecology of the infecting organism. *Proc. R. Soc. Med.*, 1971, **64**, 979.

PARKER, M. T. [Contribution to discussion.] In: *Clean air in hospitals: a conference arranged by the Royal College of Surgeons and the Institution of Mechanical Engineers, 1969*. London, Institution of Mechanical Engineers, 1970, p. 9.

PARKER, M. T. Current national patterns: Great Britain. *Proc. int. Conf. nosocomial Infect., Atlanta, 1970*. Chicago. American Hospital Association, 1971, p. 35.

PARKER, M. T. Effects of centralization on laboratory services. [Abstract.] *J. clin. Path.*, 1971, **24**, 769.

PARKER, M. T. Methicillin-resistant staphylococci. *Proc. int. Conf. nosocomial Infect., Atlanta, 1970*. Chicago, American Hospital Association, 1971, p. 112.

PEAD, P. J. Diagnostic virology in a routine laboratory, 1967–70. *Community Med.*, 1971, **126**, 64.

PEREIRA, Marguerite S. and CANDEIAS, J. A. N. The association of viruses with clinical pertussis. *J. Hyg., Camb.*, 1971, **69**, 399.

PEREIRA, Marguerite S. and SCHILD, G. C. An antigenic variant of the Hong Kong/68 influenza A2 virus. *J. Hyg., Camb.*, 1971, **69**, 99.

PERHAM, T. G. M., CAUL, E. O., CLARKE, S. K. R. and GIBSON, A. G. F. Cytomegalovirus meningo-encephalitis. [Letter.] *Brit. med. J.*, 1971, **ii**, 50.

PERHAM, T. G. M., CAUL, E. O., CONWAY, P. J. and MOTT, M. G. Cytomegalovirus infection in blood donors: a prospective study. *Brit. J. Haemat.*, 1971, **20**, 307.

PERRETT, A. D., HIGGINS, G., JOHNSTON, H. H., MASSARELLA, G. R., TRUELOVE, S. C. and WRIGHT, R. The liver in Crohn's disease. *Quart. J. Med.*, 1971, **40**, 187.

PERRETT, A. D., HIGGINS, G., JOHNSTON, H. H., MASSARELLA, G. R., TRUELOVE, S. C. and WRIGHT, R. The liver in ulcerative colitis. *Quart. J. Med.*, 1971, **40**, 211.

PETHER, J. V. S. and GILBERT, R. J. The survival of salmonellas on finger-tips, and transfer of the organisms to foods. *J. Hyg., Camb.*, 1971, **69**, 673.

PHILLIPS, I., EYKYN, S., CURTIS, M. A. and SNELL, J. J. S. *Pseudomonas cepacia* (*multivorans*) septicaemia in an intensive-care unit. *Lancet*, 1971, **i**, 375.

PILSWORTH, R. The broiler's revenge: Newcastle disease virus infections in humans. *Rural Med.*, 1971, **3**, 35.

POLAKOFF, Sheila. The efficacy of pertussis vaccines: methods of assessment. *Trinity College, Dublin, M.D. Thesis*, 1971.

POLAKOFF, Sheila. The prevention of hepatitis in haemodialysis units. *Postgrad. med. J.*, 1971, **47**, 501.

POLLOCK, T. M. Immunization—some current problems. *Community Hlth*, 1971, **2**, 299.

QUAIFE, R. A. and GOSTLING, J. V. T. False positive Wassermann reaction associated with evidence of enterovirus infection. *J. clin. Path.*, 1971, **24**, 120.

RALSTON, A. J., HARLOW, G. R., JONES, D. M. and DAVIS, P. Infections of Scribner and Brescia arteriovenous shunts. *Brit. med. J.*, 1971, **iii**, 408.

RATCLIFFE, Hazel. The differentiation of herpes simplex virus type 1 and type 2 by temperature markers. *J. gen. Virol.*, 1971, **13**, 181.

REYN, Alice, JEPHCOTT, A. E. and RAVN, H. *Neisseria gonorrhoeae:* colony variation II. *Acta path. microbiol. scand. B*, 1971, **79**, 435.

ROOME, A. P. C. H., DICKINSON, V. and CAUL, E. O. Simplified organ cultures of human embryo trachea in the diagnosis of viral respiratory disease of children. *J. clin. Path.*, 1971, **24**, 487.

ROWE, B. Precautions following salmonella infections. *Practitioner*, 1971, **206**, 567.

ROWE, B. and GROSS, R. J. *E. coli* O 142 and infantile enteritis in Scotland. [Letter.] *Lancet*, 1971, **i**, 649.

ROWE, B., HALL, M. L. M., NEWMAN, R. L. and REHN, G. *Salmonella cubana* and carmine dye. [Letter.] *Brit. med. J.*, 1971, **ii**, 401.

Scales, J. T., Roantree, B. M. and Towers, A. G. Influence of antibiotic therapy on wound inflammation and sepsis associated with orthopaedic implants: a long-term survey. *Proc. R. Soc. Med.*, 1971, **64**, 639.

Scruton, M. W. A carbon-dioxide-in-air incubator. *J. clin. Path.*, 1971, **24**, 757.

Silver, P. S. and Darling, W. M. Penicillin-insensitive gonococci in the Bolton area: preponderance in young women and immigrants. *Brit. J. vener. Dis.*, 1971, **47**, 367.

Šimkovičová, Magda and Gilbert, R. J. Serological detection of enterotoxin from food-poisoning strains of *Staphylococcus aureus*. *J. med. Microbiol.*, 1971, **4**, 19.

Skirrow, M. B. and Rogers, K. B. Cloxacillin-resistant staphylococci in a children's hospital. *J. clin. Path.*, 1971, **24**, 48.

Snell, J. J. S. and Davey, P. A comparison of methods for the detection of phenylalanine deamination by Moraxella species. *J. gen. Microbiol.*, 1971, **66**, 371.

Snell, J. J. S. and Lapage, S. P. Comparison of four methods for demonstrating glucose breakdown by bacteria. *J. gen. Microbiol.*, 1971, **68**, 221.

Sng, E. H. and Tobin, J. O'H. Antibodies to cytomegalovirus and other members of the herpes group in women and children in Singapore. *Singapore med. J.*, 1971, **12**, 223.

Stevenson, J. and Hambling, M. H. A case of Bornholm disease associated with Coxsackie-virus group-A type-9 infection. [Letter.] *Lancet*, 1971, **ii**, 873.

Sutton, R. G. A., Ghosh, A. C. and Hobbs, B. C. Isolation and enumeration of *Clostridium welchii* from food and faeces. In: *Isolation of anaerobes* (*Soc. appl. Bact. tech. Ser.* No. 5), edited by D. A. Shapton and R. G. Board. London, Academic Press, 1971, p. 39.

Sutton, R. G. A. and Hobbs, B. C. Resistance of vegetative cells of *Clostridium welchii* to low *p*H. *J. med. Microbiol.*, 1971, **4**, 539.

Taplin, D. Bassett, D. C. J. and Mertz, P. M. Foot lesions associated with *Pseudomonas cepacia*. *Lancet*, 1971, **ii**, 568.

Taylor, C. E. D. Recent advances in immunofluorescence techniques. [Abstract.] *J. clin. Path.*, 1971, **24**, 477.

Taylor, C. E. D. The use of the virology laboratory. In: *Current problems in clinical virology*, edited by J. E. Banatvala. Edinburgh, Churchill Livingstone, 1971, p. 136.

Taylor, C. E. D. and Coles, M. A. T. Urinary infection and bacterial excretion-rates in urine. [Letter.] *Lancet*, 1971, **i**, 188.

Taylor, C. E. D., Heimer, G. V. and Lidwell, O. M. Use of a fibre optic probe for quantitative immunofluorescence studies. *Lancet*, 1971, **i**, 785.

Taylor, C. E. D. and McSwiggan, D. A. Shortage of technicians. [Letter.] *Brit. med. J.*, 1971, **i**, 114.

Thom, B. T. and White, W. D. Management of pregnant women who contact rubella. *Enfield med. Gaz.*, 1971, No. 7, 33.

Thomas, K. L. Diary of IMLT-71, Aberdeen, 31 July–7 August 1971. *Gaz. Inst. med. Lab. Tech.*, 1971, **15**, 337.

Thomas, K. L. The use of gauze swabs for the detection of Sonne dysentery in schools. *Med. Lab. Tech.*, 1971, **28**, 146.

Thomas, Mair E. M. A rapid slide method for urine cell counts. *Med. Lab. Tech.*, 1971, **28**, 38.

Thomas, Mair E. M. and Baldwin, G. A blue catalase screening test for pyuria and haematuria. *J. clin. Path.*, 1971, **24**, 320.

Thomas, Mair E. M. and Robertson, W. J. Dermal transmission of virus as a cause of shingles. *Lancet*, 1971, **ii**, 1349.

Tobin, J. O'H. Rubella vaccination of postpartum women and of adolescents in the north-west of England. *Canad. J. publ. Hlth*, 1971, **62**, Suppl., p. 64.

Tobin, J. O'H., Simmons, L. E., Graves, J. F. R. and Davis, P. Shortage of technicians. [Letter.] *Brit. med. J.*, 1971, **iii**, 584.

TURK, D. C. Antibiotic sensitivity testing. [Letter.] *Brit. med. J.*, 1971, **iii**, 111.

TURK, D. C. Haemophilus disease and cell-surface antigens. [Letter.] *Lancet*, 1971, **ii**, 1090.

TURNER, G. C. Infectious and serum hepatitis. *Brit. J. Hosp. Med.*, 1971, **5**, 296.

TURNER, G. C., FIELD, A. M., LASHEEN, R. M., TODD, R. McL., WHITE, G. B. B. and PORTER, A. A. SH (Australia) antigen in early life. *Arch. Dis. Childh.*, 1971, **46**, 616.

TURNER, L. H. Bovine albumin, fraction V (Pentex). [Letter.] *Trans. R. Soc. trop. Med. Hyg.*, 1971, **65**, 412.

VALKENBURG, H. A., HAVERKORN, M. J., GOSLINGS, W. R. O., LORRIER, J. C., MOOR, C. E. de and MAXTED, W. R. Streptococcal pharyngitis in the general population. II. The attack rate of rheumatic fever and acute glomerulonephritis in patients not treated with penicillin. *J. infect. Dis.*, 1971, **124**, 348.

WARIN, J. F. and MAYON-WHITE, R. T. Measles in vaccinated communities. [Letter.] *Lancet*, 1971, **ii**, 1034.

WAYNE, L. G., DIETZ, T. M., GERNEZ-RIEUX, C., JENKINS, P. A., KÄPPLER, W., KUBICA, G. P., KWAPINSKI, J. B. G., MEISSNER, G., PATTYN, S. R., RUNYON, E. H., SCHRÖDER, K. H., SILCOX, V. A., TACQUET, A., TSUKAMURA, M. and WOLINSKY, E. A co-operative numerical analysis of scotochromogenic slowly growing mycobacteria. *J. gen. Microbiol.*, 1971, **66**, 255.

WHITE, G. B. B., LASHEEN, R. M., BAILLIE, M. B. and TURNER, G. C. Comparison of three serological methods for the detection of hepatitis-associated antigen. *J. clin. Path.*, 1971, **24**, 8.

WIDDOWSON, Jean P., MAXTED, W. R., GRANT, D. L. and PINNEY, A. M. The relationship between M-antigen and opacity factor in group A streptococci. *J. gen. Microbiol.*, 1971, **65**, 69.

WIDDOWSON, Jean P., MAXTED, W. R. and PINNEY, A. M. Antibody to an M-associated protein antigen of streptococci. [Abstract.] *J. med. Microbiol.*, 1971, **4**, Pii.

WIDDOWSON, Jean P., MAXTED, W. R. and PINNEY, A. M. An M-associated protein antigen (MAP) of group A streptococci. *J. Hyg., Camb.*, 1971, **69**, 553.

WILKINSON, A. E. Laboratory tests in the diagnosis of venereal disease. In: *Calling the laboratory*, 3rd ed., edited by W. A. R. Thomson. Edinburgh, Churchill Livingstone, 1971, p. 37.

WILKINSON, A. E. and COWELL, L. P. Immunofluorescent staining for the detection of *Treponema pallidum* in early syphilitic lesions. *Brit. J. vener. Dis.*, 1971, **47**, 252.

WILKINSON, A. E. and WISEMAN, C. C. The role of sorbent in the absorbed fluorescent treponemal antibody (FTA-ABS) test. *Proc. R. Soc. Med.*, 1971, **64**, 422.

WILLIAMS, Kathleen. Some observations on *Clostridium tetani*. *Med. Lab. Tech.*, 1971, **28**, 399.

WILSON, D. L., HALE, J. H. and CODD, A. A. Rubella vaccine trial in Newcastle schoolgirls using the RA 27/3 strain. *Med. Offr*, 1971, **125**, 320.

WORMALD, P. J. Cross reactions in skin tests between house dust mite extract and feather extract. *Clin. Allergy*, 1971, **1**, 291.

WORMALD, P. J. Observations on a seasonal increase in one laboratory in urinary infections with *Escherichia coli* resistant to two or more antibacterial drugs. *Postgrad. med. J.*, 1971, **47**, Sept. Suppl., p. 19.

Reports of the Public Health Laboratory Service, including reports of Committees and Working Parties

The hygiene and marketing of fresh cream as assessed by the methylene blue test: a report by a working party to the Director of the Public Health Laboratory Service, with a note by H. Mogford. *J. Hyg., Camb.*, 1971, **69**, 155.

Infectious mononucleosis and its relationship to EB virus antibody: a joint investigation by university health physicians and P.H.L.S. laboratories. *Brit. med. J.*, 1971, **iv**, 643.

Microbial contamination of medicines administered to hospital patients: report by Public Health Laboratory Service Working Party. *Pharm. J.*, 1971, **207**, 96.

Report on the incidence of *Clostridium botulinum* in dressed poultry, from a Joint Working Party of the Public Health Laboratory Service, the Meat Research Institute, the Torry Research Station and Unilever Research Laboratories. *Vet. Rec.*, 1971, **89**, 668.

Public Health Laboratory Service Board accounts, 1969–70. *House of Commons Papers* (Session 1970–71), No. 341. London, H.M.S.O., 1971.

Public Health Laboratory Service 1971 *Year Book, including annual report for* 1970, London, 1971.

Reports of Committees and Working Parties of other organisations to which members of the staff have contributed

British Thoracic and Tuberculosis Association. A comparison of intradermal BCG vaccination by jet injection and by syringe and needle: a report from the Research Committee of the British Thoracic and Tuberculosis Association. *Tubercle, Lond.*, 1971, **52**, 155.

International Committee on Nomenclature of Bacteria. Xth International Congress for Microbiology. Minutes of meetings, Mexcio City, 1970. *Int. J. syst. Bact.*, 1971, **21**, 111.

Executive Board, with the chairmen and secretaries of taxonomic subcommittees. Minutes of meeting, Mexico City, 1970. *ibid.*, 119.

Judicial Commission. Minutes of meeting, Mexico City, 1970. *ibid.*, 100. Opinions 38–46. *ibid.*, 104.

Subcommittee on the Taxonomy of the *Enterobacteriaceae*. Minutes of meeting, Mexico City, 1970. *ibid.*, 129.

Subcommittee on the Taxonomy of *Haemophilus*. Minutes of meeting, Mexico City, 1970. *ibid.*, 132.

Subcommittee on the Taxonomy of *Leptospira*. Minutes of meeting, Moscow, 1966. *ibid.*, 138. Report (1962–1966), Moscow. *ibid.*, 140. Statements and recommendations, Moscow, 1966. *ibid.*, 142. Report (1966–1970), Mexico City, 1970. *ibid.*, 148.

Subcommittee on the Taxonomy of *Moraxella* and allied bacteria. Minutes of meeting, Mexico City, 1970. *ibid.*, 213. Report (1966–1970), Mexico City, 1970. *ibid.*, 215.

Subcommittee on the Taxonomy of *Mycobacterium*. Minutes of meeting, Mexico City, 1970. *ibid.*, 149.

Subcommittee on the Taxonomy of *Mycoplasmatales*. Minutes of meeting, Mexico City, 1970. *ibid.*, 151.

Subcommittee on *Pasteurella, Yersinia* and *Francisella*. Report (1966–1970), Mexico City, 1970. *ibid.*, 157.

Subcommittee on the Taxonomy of *Spirochaetales*. Minutes of meeting, Mexico City, 1970. *ibid.*, 160.

Subcommittee on the Taxonomy of Staphylococci and Micrococci. Minutes of meeting, London, 1968, *ibid.*, 161. Report (1966–1970), Mexico City, 1970. *ibid.*, 164.

Subcommittee on the Phage-Typing of Staphylococci. Minutes of meeting, Mexico City, 1970. *ibid.*, 165. Report (1966–1970), Mexico City, 1970. *ibid.*, 167.

Subcommittee on Streptococci and Pneumococci. Minutes of meeting, Mexico City, 1970. *ibid.*, 172.

Working Group on Phage-Typing of bovine Staphylococci. Minutes of meeting, Mexico City, 1970. *ibid.*, 171.

MEDICAL RESEARCH COUNCIL. Characterization of antisera as reagents: recommendations made by the MRC Working Party on the Clinical Use of Immunological Reagents. *Immunology*, 1971, **20**, 3.

MEDICAL RESEARCH COUNCIL. Vaccination against measles: clinical trial of live measles vaccine given alone, and live vaccine preceded by killed vaccine. Third report to the Medical Research Council by the Measles Vaccines Committee. *Practitioner*, 1971, **206**, 458.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN. Microbial contamination in pharmaceuticals for oral and topical use: Society's Working Party report. *Pharm. J.*, 1971, **207**, 400.

WORLD HEALTH ORGANIZATION. WHO collaborative studies on enterovirus reference antisera: third report, by J. L. Melnick and B. Hampil. *Bull. World Hlth Org.*, 1970, **42**, 847.

WORLD HEALTH ORGANIZATION. Report on a regional meeting of technical and administrative staff in health laboratory services (WHO Project: SEARO 0159) held in the WHO Regional Office for South-East Asia, New Delhi, India, 16–20 November 1970. SEA/HLM/46, 1971. [Wld Hlth Org. restricted document.]

APPENDIX III

AWARDS AND EXTERNAL OFFICES ACCEPTED BY MEMBERS OF THE SERVICE DURING 1971

Mr. C. C. Stevens	O.B.E. in Birthday Honours List.
Dr. J. F. Warin	O.B.E. in Birthday Honours List.
Professor P. Wildy	Member, Board of Governors, Animal Virus Research Institute, Pirbright; Vice-Chairman, Section of Virology, International Association of Microbiological Societies.
Sir James Howie	President-elect, Association of Clinical Pathologists; Member, Laboratory Development Group, Department of Health and Social Security.
Mrs. Brenda M. Brock	Parish Councillor, Sandridge, St. Albans Rural District Council.
Dr. P. Cavanagh	World Health Organisation Consultant in Cholera.
Mr. D. Coleman	J. D. Atkinson Memorial Prize, 1971.
Dr. Joan R. Davies	P.H.L.S. Representative, Committee on Containers for Pathological Specimens, British Standards Institute.
Dr. C. Dulake	Chairman, Division of Pathologists, Guildford and Godalming Group.
Dr. A. D. Evans	J.P., County of Glamorgan.
Dr. A. L. Furniss	Chairman, Microbiology Working Party, South-East Metropolitan Regional Hospital Board; World Health Organisation Consultant in Cholera.
Dr. E. H. Gillespie	Member, Council of the Royal College of Pathologists; Chairman, Central Sterilising Club; Member, United Kingdom Panel on Gamma and Electron Irradiation.
Dr. E. J. G. Glencross	Chairman, Peterborough and Stamford Group Medical Staff Committee.
Mr. R. Harper	Vice-President, Institute of Medical Laboratory Technology.
Dr. R. J. C. Hart	Member, Microbiological Committee, Association of Clinical Pathologists.
Mr. L. R. Hill	Member, Sub-Committee on Numerical Taxonomy, International Association of Microbiological Societies; Member, Committee of Microbial Systematics Group, Society for General Microbiology.
Dr. P. A. Jenkins	J.P., City of Cardiff.
Dr. A. E. Jephcott	Honorary Secretary, Division of Pathology, North Sheffield University Hospital Management Committee; Member, Medical Research Council Working Party to Co-ordination Laboratory Studies on Gonococcus.

Dr. J. C. Kelsey	.. ..	Postgraduate Adviser in Pathology, North West Metropolitan Regional Hospital Board; Member, Laboratory Development Advisory Group, Department of Health and Social Security.
Mrs. Isobel M. Maurer	..	Member, Steering Committee for Evaluation of Disinfectants for Use in Hospitals, Department of Health and Social Security.
Dr. P. D. Meers	.. ..	Postgraduate Medical Organiser, Plymouth Clinical Area.
Dr. B. Moore	.. ..	Member, Laboratory Development Advisory Group, Department of Health and Social Security; Member Research Advisory Committee, Water Research Association.
Dr. H. D. S. Morgan	..	Secretary, Group Advisory Committee, South West Wales Hospital Management Committee.
Dr. T. M. Pollock	.. ..	Member, Sub-Committee on Biologicals, Committee on Safety of Medicine.
Dr. B. Rowe	.. ..	Member, Committee of Microbial Systematics Group, Society of General Microbiology.
Dr. C. E. D. Taylor	..	Member, Committee on Containers for Pathological Specimens, British Standards Institute; Chairman, Microbiology Sub-Committee, North West Metropolitan Regional Hospital Board Pathology Advisory Committee; Chairman, Division of Pathology, Central Middlesex Hospital Group; Member, Laboratory Development Advisory Group, Department of Health and Social Security.
Dr. J. E. M. Whitehead	..	Member, Executive Committee, West Mercia Branch, Association of Clinical Pathologists.
Dr. A. T. Willis	.. ..	D.Sc., University of Leeds; Member, United Kingdom National Committee, British Commonwealth Collections of Micro-organisms; P.H.L.S. Representative, Pathology Advisory Committee, North West Metropolitan Regional Hospital Board; Lecturer, Luton College of Technology.

APPENDIX IV

VISITS ABROAD BY MEMBERS OF THE SERVICE DURING 1971

Sir James Howie	Canadian Communicable Diseases Centre, Tunney's Pasture, Ottawa, Canada; World Health Organisation Expert Committee on Health Laboratory Services, Geneva, Switzerland.
Dr. E. S. Anderson	XIIth International Congress of the Permanent Section of Microbiological Standardisation, Annecy, France.
Dr. B. E. Andrews	IIIrd International Conference on Plant Pathogenic Bacteria, Bulb Research Institute, Wageningen, Holland; Mycoplasma Symposium of the German Association for Microbiology and Hygiene, Mainz, West Germany.
Mrs. Hazel Appleton . .	IInd International Congress for Virology, Budapest, Hungary.
Dr. G. I. Barrow	World Health Organisation Fellowship: Food and Drug Administration, Washington D.C., U.S.A.; National Institute of Health, Tokyo, Japan; Cholera Research Centre, Calcutta, India.
Dr. C. M. Patricia Bradstreet	IInd International Congress for Virology, Budapest, Hungary; XIIth International Congress of the Permanent Section of Microbiological Standardisation, Annecy, France.
Dr. Yvonne E. Cossart . .	Seminar on Viral Hepatitis, Paris, France; Seminar on Hepatitis, Barcelona, Spain; IInd International Congress for Virology, Budapest, Hungary.
Dr. J. E. Cradock-Watson . .	XIIth Symposium against Poliomyelitis and other Virus Diseases, Helsinki, Finland.
Dr. J. Craske	IInd International Congress for Virology, Budapest, Hungary.
Dr. Anne M. Field	IInd International Congress for Virology, Budapest, Hungary.
Dr. D. G. Fleck	XIIIth International Congress of Paediatrics: Symposium on Prenatal Infection, Vienna, Austria.
Dr. Sylvia D. Gardner . .	World Health Organisation Fellowship to visit laboratories in Finland, Denmark and Sweden.
Dr. R. W. S. Harvey . .	Salmonella Reference Laboratory, Pasteur Institute, Paris, France.
Dr. P. G. Higgins	IInd International Congress for Virology, Budapest, Hungary.
Mr. L. R. Hill	Mycoplasma Symposium of the German Association for Microbiology and Hygiene, Mainz, West Germany; North West European Microbiological Group Meeting, Utrecht, Holland.
Dr. Betty C. Hobbs . .	International Committee on Microbiological Specifications for Foods, International Association of Microbiological Societies, Opatija, Yugoslavia; Meeting of representatives of nine European countries on the examinational of naturally contaminated minced meat.
Dr. M. R. Hollingdale . .	Symposium on Farmer's Lung and Aspergillosis, Davos' Switzerland.

Dr. L. Hoyle	IInd International Congress for Virology, Budapest, Hungary.
Dr. A. E. Jephcott	World Health Organisation Research Training Fellowship, State Serum Institute, Copenhagen, Denmark.
Dr. D. M. Jones	XIIth International Congress of the Permanent Section of Microbiological Standardisation, Annecy, France.
Dr. J. C. Kelsey	Tanzania, on behalf of the World Health Organisation; International Colloquia on European Standards of Disinfection, Hamburg, Germany, and Zurich, Switzerland.
Dr. S. P. Lapage	North West European Microbiological Group Meeting, Utrecht, Holland.
Dr. J. A. Lee	Institute of Microbiology and Hygiene, Royal Veterinary and Agricultural University, and State Veterinary Serum Institute, Copenhagen, Denmark.
Dr. W. R. Maxted	Course on Streptococcal Infections, Minneapolis, U.S.A.; Workshop on Group A Streptococcal M-protein, National Institute of Health, Bethesda, U.S.A.; Laboratories in Los Angeles and New York, U.S.A.
Dr. M. T. Parker	Symposium on Current Topics in Clinical Microbiology, Seattle, U.S.A.
Dr. Stella M. Parrack ..	Microbiological Department, National Defence Research Organisation, Rijswijk, Holland; Communicable Disease Center, Atlanta, U.S.A.
Dr. Marguerite S. Pereira ..	IInd International Congress for Virology, Budapest, Hungary.
Dr. T. M. Pollock	Northern Nigeria, on behalf of the World Health Organisation; XIIth International Congress of the Permanent Section of Microbiological Standardisation, Annecy, France.
Dr. B. Rowe	International Salmonella Centre, Paris, France; Military Establishment, Sharjah, on behalf of the Medical Research Council's Army Personnel Research Committee Working Party on Travellers' Diarrhoea.
Dr. G. Scrimgeour	Venereal Diseases Research Laboratory, Communicable Disease Center, Atlanta, U.S.A.; Treponematoses Center, Johns Hopkins Hospital, Baltimore, U.S.A.; State Serum Institute, Copenhagen, Denmark; Helsinki, Finland.
Dr. C. E. D. Taylor ..	Ist International Congress of Immunology, Washington D.C., U.S.A.; Symposium on Rapid Detection and Identification of Microbiological Agents, Geneva, Switzerland.
Dr. J. O'H. Tobin	XIIth International Congress of the Permanent Section of Microbiological Standardisation, Annecy, France; Symposium on Rubella Vaccination of Post-Partum Women, Toronto, Canada; XIIIth International Congress of Paediatrics—Symposium on Prenatal Infections, Vienna, Austria.
Dr. A. H. Tomlinson ..	IInd International Congress for Virology, Budapest, Hungary.
Dr. Jean P. Widdowson ..	Course on Streptococcal Infections, Minneapolis, U.S.A.; Workshop on Group A Streptococcal M-protein, National Institute of Health, Bethesda, U.S.A.; Laboratories in Los Angeles and New York, U.S.A.
Dr. A. E. Wright	Libya, at the invitation of the Libyan Government, to advise on technical and administrative aspects of their microbiological service.

INDEX TO PERSONAL NAMES

Printed by The Campfield Press, St. Albans

THE ROYAL SOCIETY

FOR THE PROMOTION

OF HEALTH

90, BUCKINGHAM PALACE ROAD, LONDON, S.W.1

Borrowers must comply with the following by-laws governing the Library, made by the Council of the Society.

Books, periodicals and pamphlets may be borrowed by Honorary Fellows, Fellows, Members, Licentiate Members, Associate Members and Affiliates personally or by a messenger producing a written order. The person to whom such publications are delivered shall sign a receipt for them in a book provided for that purpose.

Publications may be borrowed through the post, or by other means of carriage, upon a written order. The postage, or carriage of publications returned to the Society shall be defrayed by the borrower.

A borrower may not have more than three publications in his possession at one time.

A borrower will be considered liable for the value of any publication lost or damaged while on loan to him, and, if it be a single volume or part of a set, for the value of the whole work thereby rendered imperfect. Marking or writing in the publications is not permitted, and borrowers are requested to call attention to damage of this character.

Books and pamphlets may be retained for twenty-eight days. Periodicals may be retained for fourteen days. Applications for extension of the loan period must be made in writing before its expiry. No publication may be kept longer than three months.

Books and pamphlets added to the library will not be lent until after the expiry of one month from the date received. The current number of a periodical may not be borrowed.

Borrowers retaining publications longer than the time specified, and neglecting to return them when demanded, forfeit the right to borrow until they be returned, and for such further time as may be ordered by the Council.

Any borrower failing to comply with a request for the return of a publication shall be considered liable for the cost of replacing it, and the Council may, after giving due notice to him, order it to be replaced at his expense.

No publication may be reissued to the same borrower until at least seven days have elapsed after its return, neither may it be transferred by one borrower to another.

Publications may not be taken or sent out of the United Kingdom.

Publications returned through the post must be securely packed and adequately protected.

The library may be used for reference by members during the office hours of the Society.

Publications borrowed through the post must be acknowledged on the form provided, immediately upon receipt, and returned when due to the Librarian at the above address.

December, 1970.

O.B., Truro.